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AUDUBON MAGAZINE

A BI-MONTHLY MAGAZINE DEVOTED TO THE PROTECTION AND PRESERVATION OF OUR NATIVE WILDLIFE

Our Motto: A BIRD IN THE BUSH IS WORTH TWO IN THE HAND

ELEANOR ANTHONY KING, *Editor*

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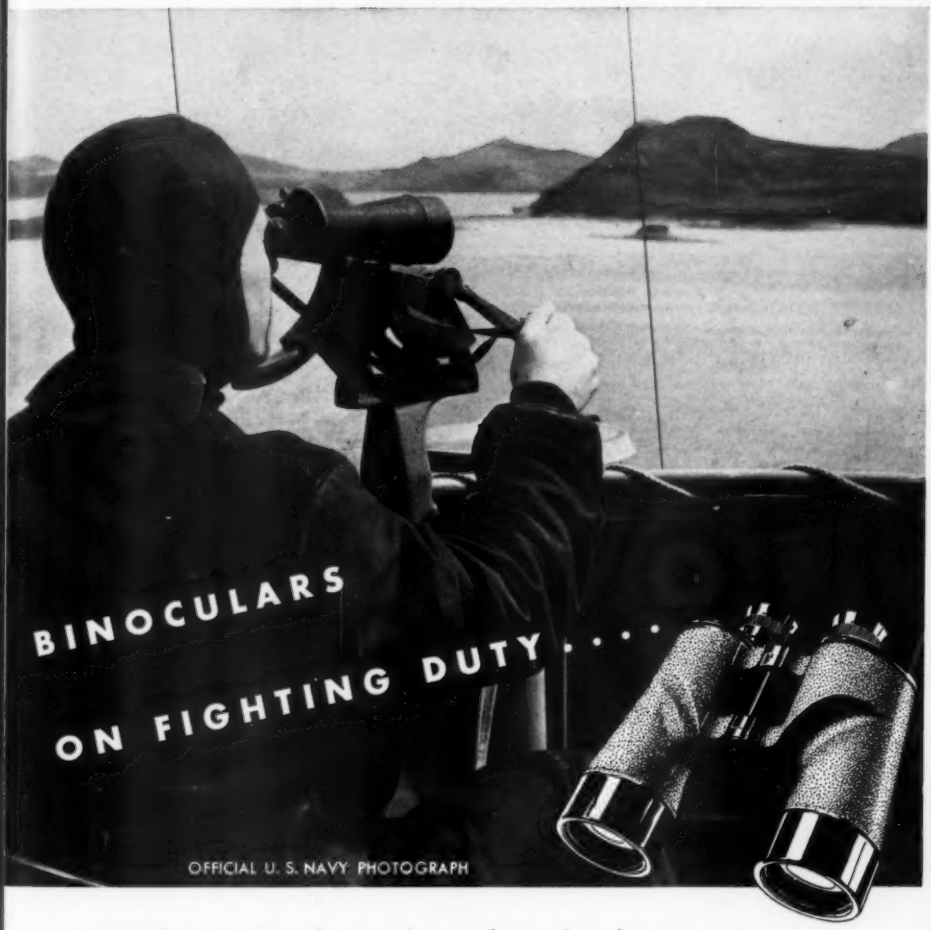

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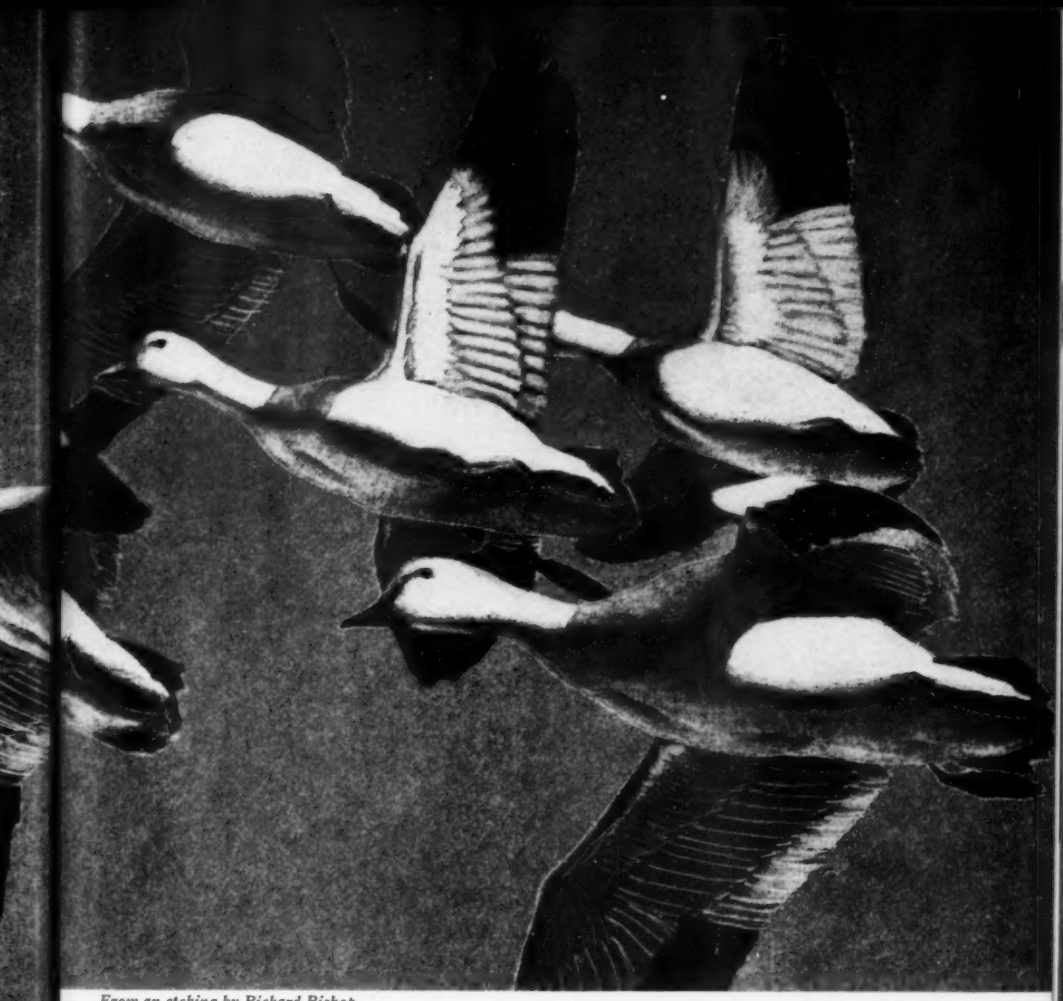


From an etching by Richard Bishop

FAMILY LIFE OF THE *Snow Goose*

BY JOHN J. LYNCH

THE snow goose gets around. He is well known to Louisiana marsh folk, since he and his first cousin the blue goose spend the winter months on our coastal marshes. At the same time, he has a better than passing acquaintance with the Eskimos of the Far North.

You could describe the snow goose as a large white bird with black wing tips and dark pink feet and bill. If you stopped there, however, anyone

who really knows the bird would think you were talking about a dead goose. To do justice, your description should include mention of the many antics which characterize a real live specimen. For one thing, snow geese are like grapes, in that they come in bunches. The only time you will see a goose by himself is when he is too sick to keep up with the rest of his flock. Thus you seldom hear the Louisiana trapper talk about a "goose," but he will have plenty to say about "them brant," as he calls the blue and snow goose.

Although snow geese are decidedly gregarious in their habits, I have yet to see one that I would call sociable. Every flock is the scene of constant bickering, frequent brief squabbles and not a few full-fledged fights. When two captive birds are placed in the same pen, their first act is to start a row. Even a single crippled goose, picked up in the marsh, will try to tear off your shirt-buttons for lack of a more engaging adversary.

Aside from this slightly dyspeptic outlook on life, snow geese are characterized by voracious appetites, and are accomplished vocalists after the fashion of a rusty door hinge. Their natural urges to talk and eat are equally strong, so that they seem to have developed a technique whereby they can do both at once. The clamor of a flock of feeding geese is unbelievable. The incessant gabbling of thousands of feeding birds, together with their trampling and splashing, merge into a steady roar, broken only by an occasional indignant *yowp* as some less fortunate goose has a few of his tail feathers pulled out by an ill-tempered neighbor.

To some trappers and cattle men, this uproar adds insult to injury. Snow and blue geese can be quite destructive to trapping grounds and cattle pastures. It is trying enough to a trapper to have geese eat up choice portions of his muskrat marsh. When this damage is accompanied by such a racket that he loses several nights' sleep along with his trapping grounds, he is often moved to comment at length and with little regard for propriety. Fortunately, such damage is localized and, in general, muskrats, cattle and geese get along without serious conflict.

Blue and snow geese leave the Louisiana coast about the middle of March, giving the marsh folk a much needed rest. Blue geese go to their nesting grounds in the eastern Arctic region of Canada; snow geese continue northward as fast as the ice breaks up, not giving so much as a glance when they pass the Arctic Circle. Tired and hungry, they finally settle down on the very shores of the Arctic Ocean where they nest in the marshy ground of Arctic islands that closely resemble the coastal marshes of Louisiana.

It is to this distant breeding ground that you must follow the snow geese if you would know, at first hand, about their family life. Not so long ago, I had the privilege of accompanying Charles Gillham of the U. S. Fish and Wildlife Service to the Far North —a pilgrimage which he makes annually in an effort to find out what kind of waterfowl crop Nature is going to produce for the next season.

Charlie and I were smart enough to set up a tent to keep out the Arctic rain and fog, but made the mistake of building our "nest" on the ground—something which the geese long ago learned not to do. A single day's walking on the half-frozen soil transforms the inside of the tent into something resembling a cattle-bog. We spent part of our time counting eggs and nests, taking pictures and collecting

different plants of the islands. The rest of our time seems to have been spent in quest of food—something very scarce anywhere north of the Arctic Circle. However, I learned a good deal about snow geese, even so.

Each pair of birds gathers up all of the dead grass in a space ten to twelve feet across, building it into a mound quite like a miniature muskrat bed. The female contributes four or five eggs, and settles down atop her new home for the best part of a month—sleeping, mostly, or fussing with her neighbors. The old gander takes domestic life very seriously at first, sometimes pacing back and forth like a worried father, other times standing erect as though he were letting sink in the full import of his new role of "solid citizen." A twenty-minute stretch of this performance is about all the old boy can stand at one time. Then he quietly departs, bound for his favorite feeding hole for a session of grass-pulling.

His mate waits more or less patiently for his return. Finally she decides that he is long overdue, covers up her eggs with grass and down, and sets out to find her tardy spouse. It is seldom, however, that she is able to get far away from her nest because marauding bands of jaegers (birds that look like gulls and behave like hawks) are constantly on the lookout for unguarded nests. Jaegers will eat a variety of things, but are distinctly partial to eggs and young birds. When they spot a nest and come swooping in for a feast, Madam Snow Goose forgets about her mate and comes squalling back to her eggs. Meanwhile, the gander hears the racket and comes sailing back to join in the fray. Jaegers are no match for the geese, provided the latter are on hand to defend the nest, but woe betide those eggs if the jaegers get there first! Then the

Allan D. Cruickshank

geese have to set up housekeeping all over again—if there is enough time left in the short Arctic summer.

While the jaegers are trying their dive-bombing tactics on a nest, all the neighboring geese guard their eggs more closely, screaming abuse at the offending birds, although a few of the more civic-minded ganders will often rush to the aid of the beleagured pair.

Following the excitement of the raid, there is a little matter of "trespassing" to be disposed of, so that it is a full half hour before order can be completely restored. Trespassing is strictly against the rules, since each pair of geese assumes a sort of protective custody over the territory surrounding its nest. With the jaegers gone, the gander suddenly realizes that his formerly helpful neighbors are now trespassers in his jealously guarded front yard, and he wastes no time in ejecting his erstwhile friends from the premises. As each bird makes his way back to his own nest, he is escorted by uncordial remarks from neighbors over whose territories he must pass. Should he make a poor landing and overshoot his own property, he finds himself in another battle. More boundary lines are violated by well-intentioned neighbors who would like to join in the fight, and minor border disputes rage and wane until finally comparative peace reigns once more.

Even the two bird students are affected by the general excitement. Awakened out of a sound sleep by the uproar, a fellow has no way of telling whether or not it's time to get up. There is no night in the Arctic summer. You don't know when to eat and never think about sleep until exhausted. Then just about the time you get to sleep, you are rudely awakened by civil war among the geese, and since it's broad daylight, you automatically get up and see about getting breakfast.

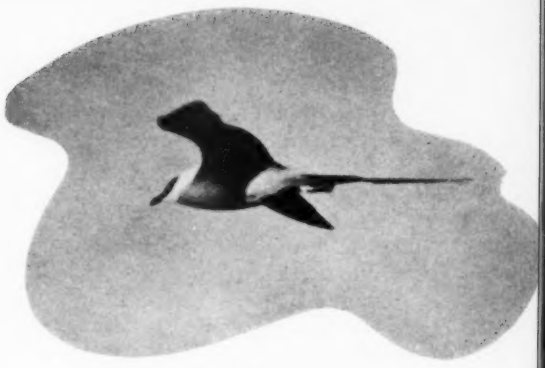
Early in July the eggs begin to hatch. Even before the young snow goose leaves the egg, his lusty cheeping proclaims that he is developing the vocal powers that will characterize him all through life. Fully emerged and dry, the gosling is soft yellow and olive-brown and altogether a very friendly little fellow. His parents stay close to the nest while the eggs are hatching, and will run at an intruder like any barnyard goose. Should the gosling be left behind, however, he will adopt the nearest living creature for a foster-parent. Although vaguely complimented when this happened to me, I have resisted temptation and walked, instead, many an extra stretch in order to carry stray young back to their nests since I know from experience that their own parents can handle their up-bringing much more efficiently than I. If the young geese are

Mother snow goose gazes at her first-born with a fond but somewhat ridiculous expression that all very new parents will recognize

as friendly with the Arctic fox as with me, I begin to suspect why the snow goose population increases so slowly.

Three or four days after the hatch, young and adult geese mysteriously vanish from the islands. This emigration is executed so quietly that a novice in the Arctic would be at a loss to find the birds again. However, Charlie Gillham, who knows the habits of these geese better than anyone else, traced down this migration several years ago. He found that the old geese brought their young into the interior of the Mackenzie Delta marshes, where they would find better food and greater security from natural enemies.

We broke camp and moved with the geese. It was not long before we began to see flocks of young and old birds. Often twenty or thirty adults will band together, moving and feeding like one noisy family. They feed along the river banks, clipping tender vegetation. The youngsters are

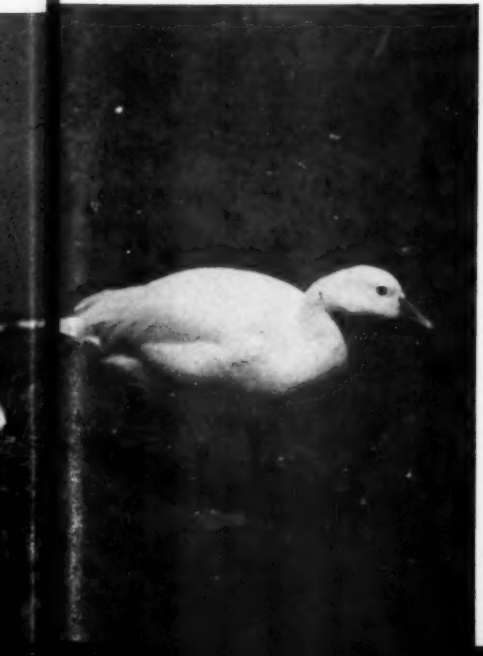


Long-tailed jaeger, arch-enemy of the snow goose.

able to feed twenty-four hours a day, and from what we could see, they lost very few of those hours. They grew rapidly and soon their legs were large enough to take our aluminum bands which we were to attach in the hope that these marked birds would, at some later date, reveal further information about their southward migration.

We treated the young birds (and ourselves) to some strenuous calisthenics. We would round up a flock in a river channel, slowly drive them to the bank and then try to catch them. You must remember that it doesn't take many squirming goslings to make an armful—so that four or five birds represented a fine catch. After banding several dozens, an increasing proportion of our catch turned up wearing bands. This situation got so bad that we wondered for a while if someone else were banding geese in the region. When we checked the numbers on the bands, however, we found that we were catching our own birds over and over. When a fellow is racing after a band of fleeing geese, loaded down by about twenty pounds of wet clothes, and tripping over vine-like Arctic willows, he doesn't have time to look after details.

. . . meanwhile daddy is down at the old mud hole, pulling grass with "the boys." Photographs on this page by John J. Lynch



He is more interested in catching more birds and more breath, also. At the end of the chase, when half of the catch turns out to be banded already, it takes much of the fun out of goose-running.

Although the goslings are accomplished runners, they cannot hold a candle to the grownups. Adult geese lose their wing feathers in summer and cannot fly. But this does not interfere with their skill in running. The old goose spreads his ragged moulting wings, starts his long legs in motion, and actually skims across the boggy tundra. We ran a few adult birds but quickly concluded that the youngsters were much more satisfactory for our purpose.

Shortage of food and fuel for our outboard, both of which are essential in following the travels of the snow goose, made us think about getting back to the "States." We had to leave ahead of the geese, since we had a much longer route to travel. When the young have mastered the art of flying, and the Arctic summer wanes, the geese start their long trip south.

I was back in the Louisiana marshes in October of that year, waiting for the geese to return to their winter quarters. I flinched when I heard the first call of a distant flock and thought of the many indignities dealt me by these noisy creatures. But when the first thin line of geese came into sight, I experienced the thrill that all marsh folk feel in the fall. The geese were back and the marsh was coming to life after the dull hot summer.

BANDING RETURNS WANTED

If you find a banded snow goose on the Gulf Coast, report the number to the Fish and Wildlife Service, Chicago, Ill. Bands furnish information of great scientific importance. Some of the banded geese already have been reported from the Pacific Coast.

Soft yellow and olive brown, a two-day-old snow goose gosling is a friendly little fellow

John J. Lynch

Hugo Schroder

HOW BIRDS FLY

by JOHN H. STORER

FLYING ranks together with hunting, homemaking and the hereafter among the earliest recorded interests of man. Many an early experimenter lost his life in attempting to imitate the birds.

Some of these would-be fliers or gliders were able to leave the ground, but none was able to stay aloft. One essential was always lacking, the ability to maintain balance in the air.

Every soaring bird held out plainly the answer to this mystery of balance, the ability to make one wing, or the tail, lift a little more or less strongly to maintain a steady course.

The Wright brothers spent long days watching birds flying over the Miami River near Dayton, Ohio, but later Orville Wright wrote: "We got plenty of flying fever from watching the birds, but we got nothing about their secret of balance."

Then, in June, 1899, Wilbur Wright hit on the idea of twisting the wings of a glider to control their lift-

ing power and balance. This was the first step toward the aileron that controls the balance of a plane or glider. It was the key that unlocked the door to flight. Later the Wright brothers recognized the use of the same principle in a photograph of a gliding gull.

Since that time the development of the slow-motion camera has made it possible to see and understand bird flight in a new way. It shows human flight as an almost exact counterpart of bird flight.

The plane is modeled after the bird, not only in its fundamental principles and construction, but even its special devices, its slots and flaps, its reversible and variable pitch propellers. These devices have been worked out through countless experiments, and many fatal accidents might have been avoided if their use by the birds had been recognized and understood earlier.

The flight of a bird may appear to be a series of confused, rather meaningless motions. But with the help of some hints from the slow-motion camera we can follow these motions even with the naked eye, in birds from pigeon size on up. We can see flying as a harmony of beautifully coordinated motions, each performing a definite function, each preparing the way for the next.

Each part of the wing, each separate feather is especially built and shaped to play its own particular part in this teamwork. The shape of the wing and the shapes of the feathers during flight are very different from their shapes when the wing is outstretched but at rest.

When we understand something about the flow of the air over the wing and the energy brought to life by this flow, we can begin to see how the rapidly changing curves of the feathers during a wingbeat are designed to capture this energy and make use of it—how the structure and shape of the feather at rest design it to take the proper, very different, shape of function against the pressure of the air.

Look at the primary feathers of a bird's wing tip, the propeller feathers. They have a wide vane behind the quill or shaft, a narrow one in front. The quill acts as a pivot for the feather. When the wing beats the feather downward the pressure against the air twists this wide rear vane upward, and the feather takes on the

These sketches show the action of the propellers and the supporting wing:

1. The pressure against the air twists the primary feathers of this roseate spoonbill till they are nearly at right angles with the rest of the wing. They become propeller blades, driving the bird forward.

2. On the downstroke the feathers of the inner and outer halves of the wing slope in different directions. The inner half always slopes upward toward the front, downward to the rear, like the wing of a plane, supporting the bird as it glides forward through the air.

The outer half does just the opposite. It is pivoted on the wrist at its forward edge. The pressure against the air twists the rear edge upward. The bird can control the angle of this slope to produce lift or forward drive as needed.

From the rear we see the light upper surface of the inner wing, and the shaded under-

very subtly designed shape and function of a propeller blade, driving the wing forward and pulling the bird after it.

Even these quills are all different. Some are straight, some are bent at right angles and stand up vertically from the wing's surface. Between the two there are all degrees of curves. Some of these quills are round in one part, flattened in another, hollow in one part, solid in another and with grooves and ridges at strategic places —all designed to control and shape the twists and curves.

Each small covert feather on the wing plays its own special part in building the most efficient wing shape for lifting. The shoulder joint is designed to hold the wing without effort at the proper angle to lift the bird. The wrist is designed to give the outer wing the proper angle which can be varied at will to add to either the lift of the main wing or the forward drive of the propeller. And the whole feathered structure is bound together by a beautiful design of membranes, muscles and sinews that swings each feather through its proper positions to function throughout the thousand split second changes of a wingbeat.

One of the most ingenious features of a feather is the design of the vanes. If the vane's surface were all one membrane it might wrinkle when twisted, or stretch out of shape, or it might be torn. Not so the feather. Its surface is made up of hundreds of fibres called barbs. They are flattened, with their sides facing each other, and they stand out from the quill very much like the teeth on a comb, but at a sharper angle, slanting more toward the feather tip. The shape of the barbs varies at different parts of the same feather to give the right amount

side of the outer wing, showing this feature.

3-4. Here we have the beginning and end of the same stroke. On the down stroke the propellers drive the wing forward faster than the bird.

Starting from a position above the body the tips move forward by a full body length faster than the bird to a position below the neck. The air drives them forward, pulling the body after them.

On the upstroke the tips sweep back to their original position above the body, still driving the bird forward as they press back against the air, or they may just drift back with the air when a bird is in leisurely flight.

Throughout the stroke the inner half of the wing gives the bird a fairly uniform amount of support, keeping it at about the same level.

There is about one-ninth second interval between these two pictures.

Flight technique varies greatly with different birds built for different methods of living, but the principles remain the same.

The flying egret pictured on page 9 shows the feather groups in position: primaries, secondaries, tertials and coverts.

of strength or twist or streamlining.

Like the teeth of a comb these barbs are spaced apart from each other so there is plenty of room for movement as the feather bends. But they are held together by rows of tiny hooked fibres, barbules and barbicels that interlock to give a very elastic and almost indestructible surface. If two barbs are separated a good shake or a stroke of the bird's bill will bring the hooked edges together again and the vane is as good as new.

When we look at a feather we see, not the shape that will be used in flight, but the design that will produce any one of a great many different shapes as they are needed to meet the fast changing conditions during flight. Each change of air pressure will bring an automatic response from the feather.

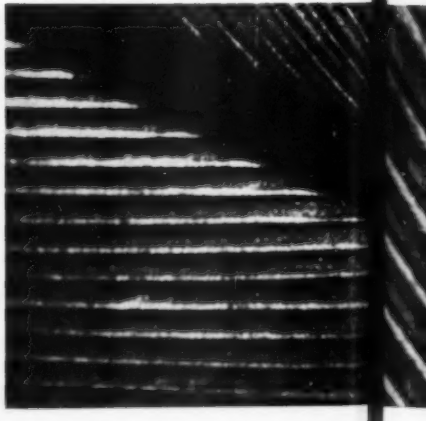
Some feathers are not used at all in normal flight, but come into play only for special occasions – maneuvering, soaring, or the difficult feats of taking off or landing. Then their value is out of all proportion to their size. For instance the alula, a little tuft of feathers growing on the rudimentary thumb at the bird's wrist, tucks smoothly out of the way in ordinary flight but swings out into position for very low speeds. Remove this feather tuft from one wrist and many birds can neither take off from the ground, nor land without a bad fall. The alula is not valuable for its own lifting ability. It acts, like a catalyst in a chemical reaction, to direct and activate the air flow at a critical point on the wing, so that other feathers may double their lifting power under some conditions.

In the same way there are times when the slots between the feathers at the wing tip, by their control of the air flow at this strategic point, control the lifting ability of the entire wing.

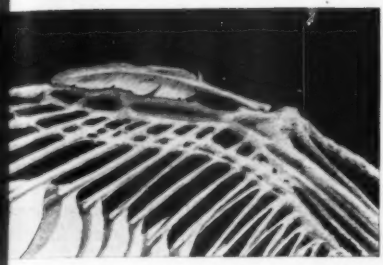
Each feather in each group is shaped somewhat differently. Even the quills have their special shapes, strengths and elasticities to make each feather play its proper part in flight.

These main feather groups are overlaid by covert feathers with many different shapes, sizes and positions, some standing nearly perpendicular to the wing surface—each one contributing its special share to give the wing its most efficient shape for lifting.

These feathers from a herring gull wing show (1) an outer primary with curved quill; (2) an inner primary with straight quill; (3) a secondary with its covert curved to give wing proper thickness for streamlining, and (4) a scapular feather which fills in the gap between the wing and the body.



The secret of the feather's efficiency lies in the design of its quills and vanes. The vane of a feather is made up of rows of parallel fibres called barbs. They are long and narrow and stand out from the quill like the teeth of a comb, pointing slightly toward the tip and spaced well apart to allow plenty of room for play when the feather bends. This magnified section of feather shows the barbs (black lines) sloping out from the central quill.

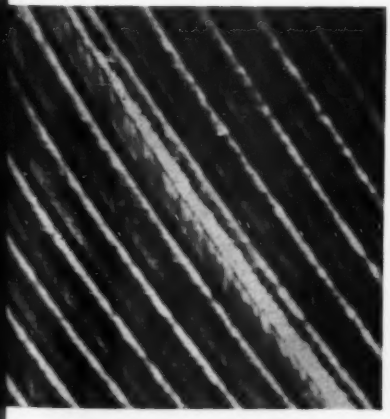


The underside of a herring gull's forearm showing finger, hand and wrist.

Above the wrist is the alula or rudimentary thumb, with one of its feathers controlled by three muscles. The hand and finger are controlled by sinews running out like tiller ropes over the wrist.

Below the hand, the membrane controlling the feathers, runs from finger tip to elbow. In the sketch it has been removed except for its lower edge, the white lines running below the hand bone.

The feathers of the hand are the primaries. The secondaries rest on the forearm. They show at the lower right each with its covert sloping above it, which adds to the curvature, determining its effectiveness as a lifting plane.



Section of feather vane with barbs separated. Solid black lines are the barbs. The shaded spaces between are filled by tiny interlocking hooked fibres (barbules and barbicels) holding the feather together yet allowing enough play so that it can twist without wrinkling. If two barbs are separated, a stroke of the bird's bill will bring the hooks together again. The diagonal white line in the picture is the opening between the separated barbs.

To a less degree, as each important feather deflects the passing air stream, its neighbor feathers are affected by it. Notice in the picture of the roseate spoonbill's propeller blades, each primary feather has a slightly different bend and twist. They are working as members of a team, each meeting the air slightly differently to produce the most effective whole. Each feather, through the thousand split second changes of a wingbeat must always keep the right relationship to its neighbors.

These propeller feathers have the same type of subtly designed twist as the propeller blade of an airplane, meeting the air at different angles from hub to tip, and for the same reason. They are moving faster at the tip than at the base.

Each wing is designed to suit the living habits of its owner. The long, narrow, feather-light wing of the albatross is a splendid wing for gliding, a very poor one for flying. The short heavily-muscled wing of the pigeon produces a powerful flier but a poor glider. The broad stubby wing of the ruffed grouse is a rather inefficient flying wing, but can carry its owner through heavy underbrush where a better flying wing would soon be ruined.

Straightaway flight on a still day is an almost automatic action, guided by the design of the wing. The much more interesting features of flight, the tricky arts of taking off and landing, maneuvering and soaring, call for great skill and the use of special equipment.

An understanding of the principles of flight opens up a fascintaing new realm of interest to the bird lover and field student. It offers one of the most spectacular and easily understood examples of the beautiful orderliness and design through all of nature.

THE COMEBACK OF TH

Ignorance and commercialism once wiped out the Garden-of-Ed abundance of cormorants and other sea birds along the New Engla coast — will prejudice wipe out the returning cormorants aga

CORMORANTS

by Carl W. Buchheister

Photographs by Allan D. Cruickshank

TO a twentieth century New Englander, it seems almost fantastic to believe that their own shores were once the scene of such concentrated sea-bird colonies as now exist only along the coasts of Alaska and Canada. Our Northeast coast was once a Garden of Eden for herring, black-backed and laughing gulls; for arctic, common, roseate and least terns; for double-crested cormorants, Leach's petrels and eider ducks; for great blue and black-crowned night herons; for bald eagles, ospreys and the "croaking" ravens. In the sea was an Eden, too. Here abounded the fishes, tiny and great—shellfish, lobsters and crabs; great herds of harbor seals; schools of porpoises and their gigantic cousins, the whales.

We have evidence that this abundance was actual and not mere conjecture on the part of those who have lived in a later period. Captain John Smith saw it, and so did those few white brethren who followed him to these shores within the first fifty years of the seventeenth century. In 1614, six years before the Pilgrims landed at Plymouth, Captain John Smith maintained headquarters on Monhegan Island on the coast of Maine. From here he explored the coastal region, from the Penobscot River to the westward. We have the intrepid Captain to thank for the first count of bird life—and for the first specific mention of the cormorant on the Maine coast.

"Eagles, Gripes, diverse sorts of Haukes, Cranes, Geese, Brants, Cormorants, Ducks, Sheldrakes, Teale,

Meawes, Guls, Turkies, Dive-doppers, and many other sorts, whose names I knowe not," wrote John Smith in 1614. "Whales, Grampus, Porkpisces, Turbot, Sturgion, Cod, Hake, Haddock, Cole, Cusk, or small Ling, Shark, Mackerrell, Herring, Mullet, Base, Pinacks, Cunners, Pearch, Eels, Crabs, Lobsters, Muskles, Wilkes, Oysters and diverse others." His listing of creatures of both land, sea and air includes many others, and his writing constantly stresses the incredible abundance of all of them.

What the Captain and his little band of adventurers saw on the great spruce-covered islands, on the barren outer rocks in the surrounding ocean waters and in the innumerable bays and inlets that are part of the 1300-mile coastline of Maine, will never be seen again. But his record, and the scattered accounts of later visitors, gives us an incredible picture of paradisaical faunal and floral abundance. Existing on, and as part of the fauna, were the red-skinned aborigines, whose shell heaps — or kitchen middens — found along the wooded shores today give further testimony of a life that has vanished. Along the Damariscotta River, within the boundaries of the town of that name, are great white banks or middens solidly packed with the shells of oysters—a form of life which has almost completely disappeared from the waters of this region.

The Indian played no part in the story of the downfall of this paradise, for he was part and parcel of it. With his primitive implements of destruction, he was merely one of a number of natural predators. He was part of the whole ecological pattern.

It was not until the settlements of the white man began to spring up on the mainland and islands, that the stage was set for the disruption of this Garden of Eden. With the white man's occupation came the introduction of dogs, cats, sheep and other mammals and the clearing of the forests for agriculture.

Continuing an ancestral custom of the old world, the settlers gathered sea-bird eggs for food. This was a particularly destructive practice, because the entire first laying had to be destroyed, in order that the collectors could return during the following days and gather fresh eggs. Thus, if a crop of birds were to be produced at all, they were hatched from the eggs of a third laying, and these were invariably smaller in number. In Muscongus Bay alone, the island names of Little Egg Rock, Eastern Egg Rock and Western Egg Rock are a grim reminder of this period of avian history.

To this disastrous process of "egging," soon was added another form of exploiting the bird colonies. Just when the use of bird plumage became commercialized is not known, but we do know this industry grew to enormous proportions in the nineteenth century. The wings and tails of gulls and terns, particularly the latter, were the most desirable items. The killing of sea birds for feathers became as commonplace a method of livelihood as fishing and lobstering. The harvest, usually, was gathered during the breeding season when birds were concentrated in nesting colonies, so that eggs were left unhatched, or the young were left to die of starvation and exposure.

But this was a matter of no concern. The profit motive precluded any thought of a controlled take that would provide for continued cropping. There were no protective laws, and what we call today a "conservation consciousness" was as yet unknown. So down the rails to Boston and New York went the shipment of cases of wings and tails, packed in the same

These gargoyle-like young cormorants were born naked but soon got a coat of black down. A youngster feeds by inserting its bill into that of its mother, who pumps up food from her crop. Within six weeks after hatching, the young bird can fly.

cars that carried barrels of fish and lobster.

While the destruction of gulls, terns, puffins, guillemots and eider ducks for food and commerce continued year after year, the old black "shags," which is what the fishermen call the cormorants, did not come off unscathed. Although not victimized as a profitable resource to any great extent, they became the object of a special prejudice. They ate fish, didn't they? Then they were the competitors

of fishermen. The old birds, their nests, eggs and young should, therefore, be destroyed. The systematic killing of the "black fowles," along with their brethren of lovely attire, went on through three centuries until gradually all of the sea birds began to disappear from the New England coast.

What had happened to our paradise of birds by the end of the nineteenth century? The herring gulls, doubtless the most abundant of all the species, had been reduced to about 2,000 pairs. This pitiful remnant had been pushed back to a few rocky islands off the eastern coast of Maine —whereas their former breeding range probably extended as far westward and south as Long Island.

The black-backed gull no longer nested south of Canada. At the end of the 1800s, it was considered a winter resident only in New England. Laughing gulls shared almost the same fate, the only known colony consisting of four pairs on Little Green Island south of the entrance to Penobscot Bay. Of the terns—only seventeen out of a hundred known colonies persisted. Like the gulls, they were well on the road to complete extirpation.

"Down East" went also the razorbilled auks, the black guillemot and

Ah, this is young love! The third party watches with a noncommittal expression. Or maybe he's just a stranger making use of an opportunity to pick up a few pointers on technique.

The harbor or hair seal, like the cormorant, has been the victim of prejudice because it eats fish, and is still killed to some extent for this reason. In Canada the Indians kill them for food and make moccasins and other articles from their skins.

the puffin. These species, although never large in numbers, were making last stands on a few islands, mostly remote outer rocks, in eastern Maine; a few pairs of puffins were to be found on Matinicus Rock; less than a hundred pairs of guillemots were known to nest on about fourteen islands; while the razor-billed auk had gone over the line into Canadian waters. Thither, also, went the eider duck.

And what had happened to the vast black hordes of double-crested cormorants? Gone. Utterly and completely gone as breeding birds on the Atlantic coast of the U. S. A.! The last known "colony," comprised of two breeding pairs, were seen in 1896 on Black Horse Ledge in Jericho Bay—the last breeding record. The score for the shags was zero. Prejudice can be thorough. So far as sea birds were concerned, the "barren coast" of New England was living up to its name.

The nineteenth century was old and almost over. Its last year, 1899, marked the potential extirpation of both gulls and terns, as well as other sea birds along the coast of Maine. Another year or two of continued destruction would have swept the few remaining sea birds from the entire coast. But one ray of hope penetrated the darkness of the closing century. In its last decades, there was an awakening to the full impact of the destruction of wildlife throughout the country. A public consciousness of the vast and imminent losses was aborning.

The precursor of twentieth century conservation came into being in the 1880s, in the "Audubon Movement." Dr. George Bird Grinnell, in 1886, formed the first Audubon Society through advertisements in his magazine, *Forest and Stream*. Fifty thousand individuals signed the pledges which made them members, but the organization was abandoned in 1899. However, the Massachusetts Audubon Society, born also in 1886, and rapidly followed by the Rhode Island Audubon Society and similar societies elsewhere, carried the movement along through these critical years until a

Cormorants of one species or another are very widely distributed birds. The guano islands of Peru are a great commercial resource. Tamed birds are also used for fishing.

new era dawned for sea birds and all wildlife.

In 1900, the Bird Protective Committee of the American Ornithologists' Union undertook the study of the critical situation of the New England sea birds. The "Thayer Fund" was created, with a total of $1400. Thus, for the first time in history, money became available for warden protection for a few herring gull and tern colonies on the Maine coast. The success of this protection was immediate, and in 1901, the Maine legislature enacted the so-called "Model Law" which provided protection for "non-game birds."

The Audubon Movement was rapidly gaining momentum and by 1905, the National Association of Audubon Societies (now the National Audubon Society) was formed and incorporated in the state of New York. The Society's growth was rapid, and the results of its educational campaign in the face of ignorance, apathy and prejudice were nothing short of miraculous. As a direct result of its efforts, more and more protection was accorded the sea birds.

By 1910, the sea-bird populations had increased noticeably. New colonies were being formed from the overflow of the old. The gulls numbered about 22,000; the terns 17,000. Owing to scant actual accounts, we have no exact data as to the numerical increase of other sea birds. They, however, could not help but benefit from the more favorable conditions along the coast, and thus we can be certain that their populations were steadily enlarging themselves.

Then, in 1916, an event of tremendous importance took place. The Migratory Bird Treaty between the United States and Great Britain was signed. Thus protection was made effective over most species of migratory

Cormorants usually nest on the ground, but on a few islands off Maine they nest in trees, doubtless for reasons of safety. They are always highly colonial, placing their bulky nests close together and never nesting singly. When the birds are young, one parent remains on guard against gulls. Here we see a few Herring Gulls perching hopefully and patiently.

Black-backed gulls are large, powerful and wary. Like other members of their tribe, they act as a Coastal Sanitation Department, cleaning up the refuse on the beaches.

The comic soldierly puffins, once victims of eggers and fishermen, now enjoy complete protection. There are only two colonies in New England—both off the coast of Maine.

birds throughout the United States and Canada. Under its provisions came the gulls, terns and other sea birds. The cormorants, however, because of their "predatory" habits in relation to fish, were not mentioned. It was feared, at the time, that the inclusion of these birds might jeopardize the passage of the treaty.

But the cormorants already had shared in the benefits of the protection and were slowly coming back, at least, as perching birds. By 1925—after a lapse of 29 years as breeding birds—the cormorants were again nesting in Maine, according to Howard L. Mendall. In 1931, the National Audubon Society sent Robert P. Allen and Arthur H. Norton on a cruise of investigation along the Maine coast. They visited all the islands from Cutler to Saco Bay and found a total of 1,748 nests!

The westernmost extremity of their breeding range was in Muscongus Bay, where Allen and Norton found four nests, all on Old Hump Ledge. By 1936, Old Hump had a total of 135 nests, and three additional colonies were found on nearby rocks, making a total of 577 nests in the bay. At last count, in 1942, this number had increased to more than 1,000.

But the cormorants were coming back all along the coast; by 1936 the breeding range had extended west of Muscongus Bay. In 1940, Joseph A. Hagar found a colony of 53 nests on the Shag Rocks at the entrance to Boston Harbor!

For recent facts about the comeback of the cormorant, we are indebted to Dr. Alfred O. Gross, of Bowdoin College. Since 1935, he has served as collaborator for the U. S. Fish and Wildlife Service and has made frequent trips to the breeding colonies. In 1943, he inspected and counted nests of al-

The arctic tern, aside from being extremely beautiful, is one of the most interesting birds in the world. Its annual twenty-five thousand mile journey includes visits to Europe, Africa, and South America. In this country it breeds only on the Atlantic Coast as far south as Massachusetts where they are on the increase.

most every cormorant colony from the Canadian line down to the Island of Shoals on the New Hampshire coast. He found a total of 9,218 nests. According to Dr. Gross, the most conservative estimate points to 10,000 pairs of double-crested cormorants on the Maine coast. Add to this at least 5,000 non-breeding birds, present in the summer of 1943, and you have a grand total of 25,000 individuals! In 18 years this bird had skyrocketed back to abundance—from zero, just previous to 1925 when the resumption of nesting occurred, to 20,000 nests in 1943!

Man had come a long way in doing his share to aid in the natural restoration of the once former flourishing sea-bird colonies. One might suppose that the practice that had caused such devastating destruction before 1900 would now only be a matter of historical record. Not so! For in the summer of 1943, while Dr. Gross was making his amazing counts, prejudice again raised its ugly head. Reports came from the Maine coast that fishermen were becoming "alarmed" at the ever-increasing numbers of shags. On September 23, 1943, a news item in the Portland *Press Herald* stated in the headline that war had been declared on the shags, the "fishermen's public enemy no. 1."

Publicity blared forth in other papers and was echoed in *Rod and Gun* columns, where the statement that cormorants were "predatory" and of "no value whatsoever" was repeated. Such newspaper stories help fan whatever flame of prejudicial interest may

Once reduced to a few thousand pairs, the herring gull is now the most abundant sea bird on the New England coast. They are a natural check on the cormorants, preying on both eggs and young. Double-crests must keep a strict vigil against raiding gulls.

Black Guillemots are called "sea pigeons" by fishermen. They get their food by diving from the surface and pursuing fish under water, using both wings and feet. This downy youngster was born in some dark and almost inaccessible crack in a cliff.

exist, and create the impression that destruction of the birds is in the best interests of man.

But do the scientific studies which have been made so far, condemn the cormorant as a fish-eater? Howard L. Mendall, of the University of Maine, and author of *The Home-life and Economic Status of the Double-Crested Cormorant,* states that the greater part of the bird's food is made up of forms which are of little or no use to the fishing industry. After a thorough study of cormorants and their habits he has come to the conclusion that the species as a whole does little if any damage to man's interest; in some cases, are even beneficial, because of their fondness for undesirable fish. And Harrison F. Lewis, of the National Parks of Canada, who has made extensive studies of cormorants, has come to the conclusion that the double-crested cormorant is not economically injurious in the northeastern maritime region, and that its influence as a check upon the sculpins is probably beneficial.

Most of us know from demonstrated instances of the past, that the best interest of man lies in treating "a problem" of this kind with strict regard to fundamental biological and ecological factors. Removal of protective restrictions and wholesale indiscriminate "warfare" is not only viciously destructive of wildlife, but usually has boomerang effects that are not in man's interest.

Control of any form of wildlife is a biological problem of considerable complexity. If the "current agitation" for destruction of the cormorant should become an actuality and not a rumor, then it should become the responsibility of whatever governmental agency—state or federal—is involved to conduct thorough scientific and biological studies. If investigation should reveal that limited control of cormorants is justified, then such con trol should be managed by responsible authorities and exercised with the utmost regard for the present and future welfare of the species. We have seen how ignorance and prejudice dealt with the cormorants in the past; it can happen again if "every Tom, Dick and Harry" is allowed to "control" the shags according to his own whim!

POST-WAR PROSPECTS

Photographs by Farm Security Administration

By Aldo Leopold

THE impending industrialization of the world, now foreseen by everyone, means that many conservation problems heretofore local will shortly become global.

No one has yet asked whether the industrial communities which we intend to plant in the new and naked lands are more valuable, or less valuable, than the indigenous fauna and flora which they, to a large extent, displace and disrupt. Such a question requires a degree of objectivity not yet achieved, either by mice or by men.

We have, though, gone half way. The conservation movement is asking whether the impact of industry on the biota cannot be made more gentle, more intelligent, less wasteful.

One defect in conservation is that it is so far an *ex post facto* effort. When we have nearly finished disrupting a fauna and flora, we develop a nostalgic regret about it, and a wish to save the remnants. Why not do the regretting and saving in advance?

There is little evidence, in the cases now pending, of any such advance planning.

Take the Alaskan Highway, a military necessity, but also a dismemberment of the last large wilderness in North America. I hear my neighbors anticipating a motor trip over the highway, but they do not foresee its probable effect on the grizzly, the mountain sheep and the caribou. They do not foresee that the present

highway, which splits the wilderness in half, will soon be followed by stub highways which split it into quarters, sixteenths, etc. They do not realize that air-highways to new mining camps already traverse the land of little sticks; that air-borne trappers are using poison to harvest fur on the tundras. They are unaware of what all Arctic history hammers home: that outdoor ethics evaporate under the midnight sun.

Again, take the impending industrialization of South America and Mexico. Power machinery and guns have heretofore been scarce and localized in these countries. Will our good neighbors use these new toys any more wisely than we did?

Siberia is being industrialized with dramatic speed. No one knows the details, for the Russians hold their cards close to their chests. If plan-wise conservation is possible anywhere in the world, it should be possible in Siberia among the pioneers of planning. Siberia has a rich resident fauna, and in addition has long been a reservoir for replenishing the migratory wildlife of Europe, especially waterfowl. What the Siberians do with their newly acquired guns, plows, cows, drainage machinery and roads will be felt from the Arctic Circle to the Nile.

Within the United States, wildlife problems seem to grow as fast or faster than solutions.

We have been able to bring back the waterfowl part way because both ends of their migration route were in good shape; all that the birds had to do was to run the gauntlet between. The gauntlet is now lengthening. Sportsmen from my home town now go to Churchill for goose shooting, to The Pas for ducks. Oil wells, already present in the winter home of the blue goose, now look hopefully at the Everglades. Mexico wants tourists, and will surely get them, both with and without guns. International treaties speak with less authority than oil wells and chilled shot.

Our internal problems were heretofore problems of scarcity. The last decade has now added new problems of excess. Excess deer and elk are eating up many national forests, national parks and other forest and range lands. There is little evidence that the public is learning to foresee and *prevent* these outbreaks, as distinguished from attempting to cure them. When the time for cure arrives, the damage to the habitat is already completed.

There is a prevalent assumption that conservation education is making headway, albeit slowly. It is assumed that if we reach good people with good educational materials, that good results will follow. I wonder if this does not over-simplify the problem.

The other day I noticed, on the front lawn of a successful doctor, a mountain ash tree in process of strangulation by a wire which had been wrapped around it years ago. The doctor passes within three feet of this tree four times a day. He either has not seen the wire, or he has no concept of a tree as a living thing, or he attaches no value to the tree, or he fears that a rusty wire might soil his gloves. This doctor would instantly detect, and act upon, any human body similarly threatened, nor would he spare gloves in doing so. My guess is that he, as an "economic man," has outgrown any consciousness of land, plants, or animals, except perhaps during the hunting season, when he shows brief interest in game birds. The quality of this interest is on a par with his interest in golf balls. Both are objects to be pursued for sport, and then forgotten.

The concept of mountain ash as a cog in the biotic mechanism of his na-

tive state is, I fear, nonexistent in his mind. He has no mental picture of mountain ash as winter color, as a full dinner pail for the returning robins, as a scent of blossoms on a May evening. Such concepts lie outside the boundary of his area of consciousness. His area of consciousness, and everybody else's since the world began, is moving. The prevailing direction is *away* from the land. Can education change this? I wish I knew.

While the post-war prospect is for the most part a gloomy one, it is not wholly devoid of encouraging omens.

In my view the most encouraging is the recent discovery that the fertility of the soil determines the nutritional value of the plants grown on it. We have heretofore assumed that it determined only the size of the crop.

At first glance this may seem irrelevant to conservation. Actually, it may prove to be revolutionary. It means that hereafter every plant, including every agricultural product grown for food, will have a qualitative as well as a quantitative value. "A bushel of wheat" will no longer define anything. It must also be specified what vitamins, minerals and other determiners of nutritive value that particular bushel offers. Wheat grown on healthy soil carries the potentiality of healthy animals and healthy people: wheat grown on abused soil is something less than wheat.

This new concept affects conservation in many ways. First, it knocks the props out from under the prevalent assumption that our relation to land is wholly economic.

Secondly, it may ultimately explain many successes and failures in bird and mammal conservation which are now recognized as facts, but for which no reasons are known. The grouse and rabbit cycle, for example, has been suspected of being a nutritional phenomenon. This lends new color to the suspicion.

Thirdly, and most important, it places on the landowner a new obligation to conserve the soil, and one less easily evaded than the old and familiar obligation to posterity. He who erodes his field now erodes the health of his children and his neighbors. It is ironical that chemistry, the most materialistic of sciences, has thus unwittingly synthesized a conscience for land-use.

F. S. A.

No More Wilderness

Let this illuminating article start you off on the road to global thinking

By Sherman S. Hayden

LOOK at the map on pages 32-33 and you will see that the "settled areas" of the earth form a sort of girdle around it in the middle latitudes of the northern hemisphere, with southerly extensions curving back along the humid coasts of the northern continents. Here, and in the corresponding but far smaller areas of the southern hemisphere you will find all the great cities, centers of industry and lands under the plow. Here most of us, and our ancestors, have lived since history began.

Much of this area has been scarred by the war and no part has wholly escaped its effects. Millions of men and women will be in need of every material thing after the war—food, the tools of living, personal possessions and, in many cases, new homes. Meantime the demands of the war are exhausting or depleting our material resources—notably petroleum which as fuel, lubricant and source of power is literally the lifeblood of industrial civilization. We are already extending our search for goods into less populated zones and the needs of a new world will drive us to seek out the last of the wilderness. Air transport has supplied man with the means of reaching every point on earth and modern medicine, together with technical advances in the art of living, has made it possible to settle almost anywhere.

In the polar projection map on pages 32-33 you can look down on the world from the top of the North Pole. Between the settled belt and the Pole lie the northern forest zone and the Arctic rim of tundra and frozen desert. "Outside" the settled area lies a belt of arid land, largely following the margin of the tropics but projecting deep into the heart of the two northern continents.

Beyond that we come to the tropics, part forest, part open lands. The same sequence is, of course, repeated south of the Equator, but in a fragmentary way, owing to the relative distribution of land and sea.

All these zones lie open to easy penetration. Mr. Leopold explains in his article, in this issue, how the Alcan Highway has already cut a swath across America's Northwest. Thousands of Americans are seeing an area that few indeed ever saw before. Doubtless many of them hope never to see it again! But some will go back and many will follow them, seeking fortune. The need for oil has already forced the opening of the Norman field on the lower Mackenzie, and even richer deposits are believed to lie around McMurray in northern Alberta. Moreover, the airways to Asia pass across the Northwest and already the wilderness is dotted with way stations.

Potential Colonization

Even more startling is the recent growth of Asiatic Russia under Soviet direction. We all know that without

the industries of the Ural area and the Kuzbas, Russia could not have beaten off Hitler's armies. Less known is the fact that the valley of the Lena, in northern Siberia, is becoming a new Empire. A few years ago, Yakutsk was a lonely village in the waste, visited only by a few prospectors and reindeer tribesmen. In 1943, Mr. Willkie found it a thriving little city of 50,000—almost the pre-war population of Alaska, and fast growing. Verkhoyansk, formerly distinguished only as the coldest place on earth, has become a center of tin production. Skyways and seaways are at last making a reality of the northeast passage to Asia. Nordvik, on the Arctic Ocean, is already an oil depot and the north Siberian coast may soon be frequented by trade. And the Russians mean business. Their plans contemplate a population of a hundred million for Soviet Asia and given their enthusiasm, modern knowledge and a high birth rate, there seems no reason why they should not attain it.

As for the tropics, Brazil contains the largest tracts of unsettled land in the world. Here is the most promising field for emigration after the war. Under the vigorous personal rule of President Vargas, Brazil is herself becoming an industrial nation.

In Africa, too, lie vast areas of grassland and savanna as yet untouched by civilized living. Less immediately promising, on the whole, than South America because the tsetse fly problem is still unsolved, these lands yet offer subsistence to a large native population which, once adjusted to modern civilization, can be multiplied many times. Meanwhile the development of mineral resources, especially in the Belgian Congo, has been stepped up by the war to a very high degree, though we are not yet allowed to know just how much.

Even the rain forests are no longer impenetrable. Since we began to fly over them instead of following the watercourses, we have learned that good land exists in the Amazon and Congo basins, as well as flood plains and impassable jungles. Some day people will live there, too.

Whether all these areas will actually be closely settled and exploited in the twentieth century is not the point. What we do know is that they all *can* be reached, lived in, and put to use, and that the pressure of civilization upon some part of all of them will be very great.

Wildlife Reservoirs

But what of the native wildlife? The northern forest is the last stronghold of the fur-bearing mammals—bears, foxes, the sable and others. Here, and to the northward, we meet the caribou and finally the muskox—interesting creatures in themselves and a possible source of meat. On the African plains still roam the last huge herds of big game; here dwell the elephant and giraffe, the lion and leopard, the zebra and all varieties of antelope. In Africa's forests we find the great apes, the chimpanzee and gorilla and many other animals, some rare and, of course, irreplaceable if once eliminated.

South America largely lacks big game, but stands second only to Australia as a museum of ancient and primitive mammals--the tapir, the sloth, the anteater and armadillo, and many kinds of rodents, some as large as small deer, not found elsewhere.

As for birds, the waterfowl of the Old World nest in Arctic Russia, as ours do in Canada. Their autumn flight takes many to the marshes of the Sudan, or to the more limited and, therefore, more densely "populated" lakes and swamps of the in-

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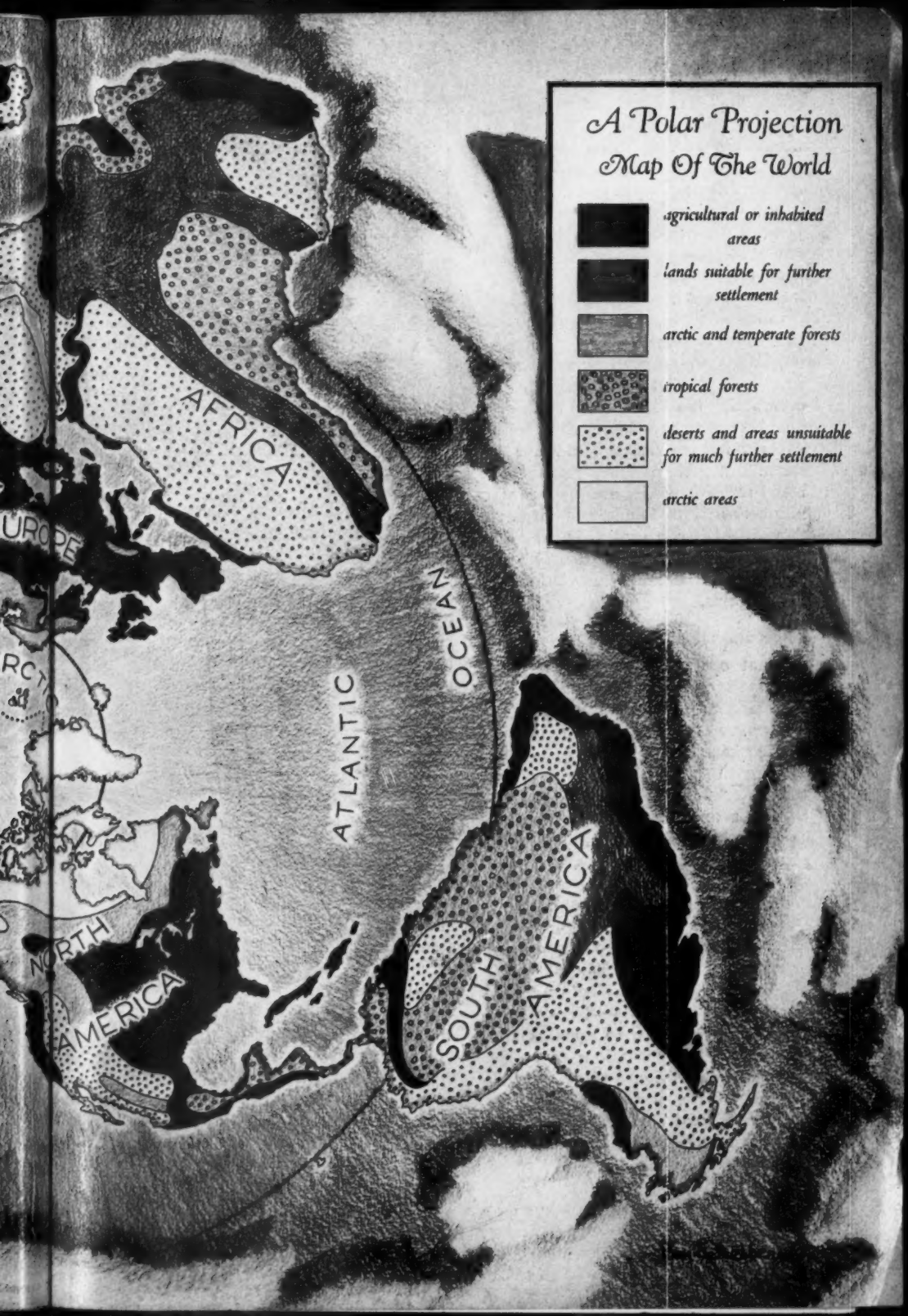

A Polar Projection
Map Of The World
agricultural or inhabited areas
lands suitable for further settlement
arctic and temperate forests
tropical forests
deserts and areas unsuitable for much further settlement
arctic areas
AFRICA
ATLANTIC OCEAN
SOUTH AMERICA
NORTH AMERICA

terior of Asia. The corresponding birds of southern South America fly northward—to the Chaco and Southern Brazil. The nation which rules any part of these areas can determine, to the extent of its dominion, the survival of a species. What is the use of our protecting yellow-legs if they are massacred in Barbados? or of England's protecting wild geese whose eggs are systematically cleaned out at the breeding point?

The tropics are a treasure house of strange and beautiful bird life, as everybody knows. Most Audubon members may also know that South America has the richest bird fauna on earth. But perhaps fewer realize that many tropical species are low in total numbers of individuals, compared to those of higher latitudes. Drastic disturbance of a limited area may wipe out an irreplaceable association of living forms.

International Task

What can we do about it? It is plainly a case for international action. Migratory birds and mammals and some more sedentary species whose ranges overlap frontiers, are obviously the business of two or more countries. Even where this is not true, is it not open to question whether any nation, blessed with a monopoly of some natural resource, has the moral right to use it up without reference to the needs of other nations? Does not this apply as well to animals having a market value as to copper or nickel or camphor or kapok trees? Should the right be any better where the animal lacks any obvious economic use? It seems to me that the time has come for nations to recognize a common duty to preserve what we can of the world's wildlife on the ground of its natural beauty, its scientific interest, or simply for its own sake. The lead must come from nations which already realize this. For some countries do not realize it and are not likely to, except under pressure of international public opinion.

Sherman Strong Hayden has been interested in birds all his life. Born in Cleveland, Ohio, he was educated at Harvard and Columbia University, and has both taught and practiced law. He is the author of "International Wildlife Protection," published by Columbia University Press, a book written as a thesis for his Ph.D. He is at present Assistant to the President of the Foreign Policy Association, where he is also Director of Popular Education and Editor of the Association's *Headline* series.

Past Efforts

Some steps had been taken before the war. The shining example of such cooperation is the treaty of 1911, signed by the United States, Great Britain, Russia and Japan, which saved the Alaska fur seal. Largely successful, also, was our treaty of 1916

with Canada which gave international protection to migratory wildfowl and made effective federal game laws possible in the United States. Another treaty signed in 1902 pledges the nations of Europe to a fair degree of bird protection, but some countries, notably Russia, never signed it, and others never enforced it very well. In the same way, an international convention presumably protects the whale against reckless commercial exploitation, but it has not proved nearly effective enough.

One major task for the future, then, will be to devise and enforce more adequate laws within and between nations for the protection of migratory birds and the mammals of the polar and subpolar regions. A vital part of the task—for geographic reasons—will be to attract the interest of the Soviet Union. Perhaps we may dare to hope that the United States and the British Commonwealth will continue as they began; but the active support of Russia, which owns *over half* the northern zones shown on our map, has never been obtained in an international way, although it is said that they are making rapid strides in domestic conservation. But in what we hope will be a more settled future for all of us, the cooperation of this great people is absolutely indispensable to solving the wildlife problems of the Northern Hemisphere.

In tropic or semi-tropic areas also, a beginning was made before the war. In 1933, the nations having territory in Africa agreed to establish game refuges, to protect threatened species, and otherwise to secure as far as possible at least a minimum future for Africa's wildlife. Some of these nations, particularly Belgium and the Union of South Africa, have taken notable steps in carrying out this program. Whatever the political future of Africa is to be, it is highly important that this good beginning should not lapse, but rather be extended.

Need For Cooperation

The African convention was to have been followed by a similar one concerning Pacific territories, but this never came off, because the war intervened. Now the picture is changing fast. India seems certain to come of age very soon. What will higher living standards for India do to the remnant of its wildlife? The expulsion of Japan from southeast Asia will almost certainly be followed not only by reconstruction, but by rapid economic development—which the Japanese would like to bring about for their own benefit, if we gave them a moment's breathing space! Does this mean the end of the Sumatran rhinoceros, or of the marvelous pheasants of Burma and Yunnan? The answer is yes—unless education and cooperation accompany such development.

In America, a foundation for international conservation was laid in the Pan-American convention of 1940, now signed by nearly all the member republics. Modelled on the African treaty, it binds us all to protect our wildlife by appropriate laws. As an expression of Pan-American unity, it gives to many of the smaller nations the first incentive they have ever had to take thought to their native fauna.

The need for international cooperation in wildlife conservation is clear. If our faunal heritage is to be saved, sanctuaries must be provided and managed, game laws enacted and enforced, commercial use of wildlife controlled, and supervisory bodies set up. We already have the fundamental knowledge, and considerable experience to go on—it is the will to act, and to act together that must now be created.

White

White-Foot

by ALAN DEVOE

TO think of "wild animals" is generally to be put in mind of some great graceful beast like the white-tailed deer, or some wary embodiment of feral cunning, like a fox, or perhaps some maker of one of the savage wilderness-sounds . . . a great horned owl, for instance. When we think of wild animals, we mostly think of the shy ones, the fierce ones, the huge ones, the haunters of the heart of the wilderness.

Were wild animals actually limited to these, of course, most naturalists would have a hard time of it. Unhappily enough, bears do not flourish now in the small forests to which most of us have access. In the greater part of the country, a man must travel many a long mile to hear the scream of an eagle. The wilderness—pushed back, thinned out, cut over, and otherwise harassed and lessened by urban encroachment—is in a great many places not now sufficient to give shelter even to white-tailed deer or to the most ingenious fox. Wild animals, in this sense of the big and shy and savage ones, are not any too easy to see.

But the category of wild animals properiy includes a great many other kinds of creatures. Technically, I daresay, even a paramoecium is a wild animal. It is an animal, certainly; and it is not domesticated. Without stretching definition to quite this extreme, there are still hosts of little dwellers in even the meagerest woodlot which are wild animals just as truly as a cougar is a wild animal. For instance, there is the little tawny-backed and snowy-bellied mammal called a white-footed mouse or deer mouse.

Wherever a patch of countryside remains unlayered by concrete and reasonably undistracted by human enterprises, there—in that small fragment of wilderness, that miniature forest which may occupy no more than a corner of a suburban dooryard—there frisks and flourishes White-Foot. He is a very small kind of wild animal, yes. But he is just as agile and as warily furtive as a lynx. He is just as savage, in his wild instinctive sense of territory and possession, as a gray wolf. He has just as much of intuitive wild wisdom as guides any forest-prowling fox or hunting owl. I suppose that White-Foot never has a total over-all length of more than perhaps eight inches. But he is a wild animal, and he bespeaks the aboriginal earth and symbolizes the spirit of the forest-places, in his small way, no less eloquently than any moose or wolverine.

In my own woods, luckily, there are deer, foxes, raccoons, skunks,

muskrats, weasels and many another wild animal, not excluding lynx. I watch them year in and year out, and listen to them, and pry constantly into their lives to come to as full an understanding as I can; and all of these wild things, in their various ways, are an excitement and a wonder. The squalling of a "cat-owl," now, . . . that is a stirring and tremendous thing to hear. The war-drum booming of a grouse: could any sound more quicken a man's blood, more surely arouse in him a primal earth-exulting that is as old as this star? It is a profound experience to watch a doe guarding and guiding her spotted fawn, or to see the black-masked faces of young raccoons peeping neighborly out at you from the hole in their coon-tree.

But these things are hardly happenings of every day. You do not go out into the woods, and sit down on a stump for a minute or two, and have raccoons coming quickly to companion you and deer promptly presenting themselves for your inspection. Those are the rare and special events.

But there is this one wild animal that can fairly well be counted on: White-Foot, the deer mouse. Go out into the fresh snow, of a winter morning, and surely you shall find the tracks of him. Go quietly into the forest night in summer, and flash a torch, and there is the gleam and glitter that lets you know White-Foot is multitudinously abroad. Have a look at the deserted birds' nests in the autumn, and no long inspection is needed to find White-Foot's hoards and caches in them. For anyone who lives in a country house, indeed, it is hardly necessary to go outdoors at all to make the intimate acquaintance of at least this one wild animal. White-Foot comes into the house. He brings the outdoors indoors. He is discovered in a corner of the earthen cellar, engaged in making a seasonal nest there, out of little strips and shavings of lugged-in cedar-bark. Or he sits on a steam-pipe, licking and preening his immaculate coat and whiskers, fastidious as a weasel. He may be heard to squeak and chitter in the walls. With good luck, he may be heard to utter his mouse-version of a song. It is a tiny wiry trilling; and in its way it is as moving a wild melody as any of the greater musics to be heard in the deeper wilderness.

The life of every wild animal, in my woods or anyone's woods, has certain common terms that form its pattern: the birth; the infancy and adolescence; the adult activities of food-hunting and mating and evading enemies and perhaps engaging in rituals of play; and at last the death, by disease or age or (usually) violence. White-Foot is so common, in even the littlest wilderness, when not actually in man's cellar or garret, that it is easy to see and study his particular version of the common pattern. No moose in your woods? No bears to observe around the place? There is always White-Foot's acquaintance to be made.

The beginning of the cycle of White-Foot's life, which is to say the birth, may happen at nearly any season except in the time of bitterest cold. Most often, perhaps, it may come about in April, in the early thaw-time of the year, when the woods are giving off their stirring smell of wet dead leaves and roots and drenched spring mosses. There are many places for the birth: a mole's old tunnel, a deserted chipmunk burrow, a little "form" of grasses in the lee of a boulder. Possibly oftenest, the birth may be in a hollow log (as in Audubon's depiction), in a soft nest of leaves or milkweed silk or

shredded bark. There are four to six babies in the litter; and they lie together tiny, pink, blind. An infant White-Foot is a helpless mite, without awareness except of the warmth of the enwrapping nest, without competence except to suck (but most prodigiously) at sweetly mouse-milky nipples.

In most wild animal mothers there is devotion. In the mother White-Foot it is tremendous, the more touching because of her littleness. Not only does she stay protractedly with her babies, suckling them endlessly, licking them, spreading her warmth protectingly across them, but on her excursions from the nest she is incessantly watchful for danger that might threaten them. A baby White-Foot is a tempting meal for many a woods-prowling carnivore. Let the mother White-Foot, as she patters in search of seeds and buds and berries, catch on the spring wind the musky scent of nearby weasel, or let her find a man treading too close to her babies' hiding-place, and instantly she scampers back to the nest.

She picks up her young ones, as a lynx does (or a squirrel), by the napes of their necks; and she runs with them through the underbrush to a new and safer hiding place. A mother White-Foot will make half a dozen trips like this, in the teeth of the gravest danger, heedless of her safety. Should danger come suddenly upon her and her brood while they are all in the nest at suckling-time, there is a natural provision to make family-escape possible. A baby White-Foot, clinging to a nipple, holds it with a kind of automatic firmness, as a perching bird's foot automatically clenches the branch on which the bird roosts asleep. Mother White-Foot flees from sudden danger with her babies clinging danglingly but inseparably to her.

When young White-Foot is ready to leave the nest and enter the world of animal adulthood, he looks very like his begetters except that his back has more of gray and less of the tawny deer-hide color. He goes forth into the greening outdoors under the necessity to develop life-lores as many and subtle as those of any other wild thing. He is only a mouse; but he is a wild white-foot mouse, which is a very different creature from the dingy hanger-on called a house-mouse; and he needs to perfect woods-skills: tree-climbing, for instance, and tracking, and the art of adapting birds' nests.

Photograph by Allan Cruickshank

All the White-Foot tribe spend much time in trees, clambering and leaping with squirrel-agility to get such delicacies as yew-seeds or such durable storage-foods as cherry-pits. Young White-Foot learns how to scale vines and creepers; he grows adroit in climbing out on the farthermost twig-tips, to get the seeds and buds that are beyond the reach of squirrels; he learns to dodge around a limb or a trunk, when an owl-hoot sounds in the darkness, just as a chickadee dodges at the sound of a shot.

As for the tracking, well . . . it develops into an astonishing art. In the woods I have watched a White-Foot come darting erratically across a clearing, and then have seen a second White-Foot come along a few minutes later; and, though the second mouse is hurrying pell-mell, he follows every tiniest turn and twist of the first one's trail as though it were an unmistak-

able highway (which of course, to his alert and quivering little nostrils, it is). A fox cannot follow a cottontail with a subtler expertness.

The adapting of birds' nests is something that White-Foot learns early in life. It is the White-Foot way to make a number of seasonal homes and caches, to be near varying food-supply and to insure against the winter. White-Foot seeks out last summer's birds' nests (very often red-eyed vireos'), domes them with coverings of barkstrips and leaves, and hides troves of pits and seeds in them. They make a good warm sleeping-place, too, in the winter wind.

All summer White-Foot's education continues. Not education, of course, in the human sense, but the educement and maturing of those instinctive and intuitive lores which form the wild wisdom that serves the animals as mind. In the darkness—for White-Foot is mostly nocturnal—he explores and establishes a territory. He recognizes the pattering tread of other mice, in the darkness, and signals to them—even as wolf to wolf—by the utterance of his cry: his small shrill squeak. He stamps and drums on the forest floor with his tiny paws —even as a buck deer hoof-signals—in challenge to the male mice that trespass on what his wild instinct of proprietorship tells him is his territory; and if necessary he does battle.

Along with fierceness and wariness, there grows also the spirit of play, which is likewise a part of wildness. White-Foot participates with his comrades in scampering rigmaroles and exhuberant mousy games of tag, under the moon. He learns the excellence of a special White-Foot food-supply: the shed antlers of deer. He learns vigilance against owl and weasel, and against the small and deadly shrew. He comes to have, as his full maturity approaches, the kind of indefinable cunning which in all animals supplements and amplifies the hereditary genius of instinct.

White-Foot acquires an extraordinary competence with his tail. On an excursion into one of man's cellars, when White-Foot gnaws the cork from a molasses-jug, he need not be defeated by the problem of how to get at the jug's contents. He can lower his tail into it, and haul up the sweet stuff as efficiently as a man hauling a bucket up out of a well. (Once, in a day of more ready belief in dogmas, I had devoutly supposed this allegement about mice to be what used to be called a nature-fake. But White-Foot comes often into my cellar, and I have watched him over the years, and he has let me know what many another wild animal has let me know: that the wisdom of the beasts, even the least of them, is not readily to be packaged into a theory, or its mystery briskly unriddled by a flourish of textbook terms.)

So much for a skeletal telling of the life of White-Foot. The life comes full-cycle, of course, on that night when in the darkness White-Foot meets, rubs whiskers, and mates with a female of his kind, and there is initiated a new generation of squirming pink youngsters. The whole story of the cycle is not, perhaps, a very spectacular tale. White-Foot's life is not one of the gigantic dramas of outdoors. But to watch it and know it, with intimacy and insight, can still give the thing that all of us are wanting when we look to the animals. It can acquaint us with a kind of simplicity, a species of innocence, and an old prerational wisdom, which we obscurely feel ourselves to have lost disastrously, and for which we hunger. Even a mouse can be, as an old phrase has it, a messenger from Eden.

Don Eckelbeery

THE IMMORTAL TOUGHY

By Myrtle Morrow Williams

TOUGHY MALONE was a wag. Just a mockingbird, but with such an abundance of what it takes that for four years, summers and winters, he drew us and our guests to the garden or the bow window with the pull of a circus parade. To watch Toughy and his antics; to see the product of his mischief, his slyness, his plots to prove his superiority in his little world, was a source of entertainment that never palled. We named him Toughy because he was a tough; and Malone because of his belligerency plus the fact that a bird with his individuality called for more than just a front name.

He attracted our attention the first winter we lived here; in fact, he furnished the inspiration that eventually made it possible for him to indulge his waggish instincts . . . perhaps to develop them. To wit, he made us so bird conscious that we began putting out feed at once . . . come one, come all. And all kinds came. They became his subjects. It was upon these that he practiced his impish humors and among these that he demonstrated his ability as terrorist. But,

I'll state here that, when raising a family, he did not stop at birds for victims. Anything on legs came under the jurisdiction of Toughy when the paternal urge stirred him. Nor was he practicing prankishness then. No, indeed! Being a father was deadly serious business!

That first winter when we noticed him, Toughy was a solemn looking object and the only mocker that hung around. We thought him pathetic. So orphaned, dependent and apprehensive of life; sitting on the porch railing silhouetted against the snow. He would never be able to take it, we thought; never survive the season. He must be delicate, exotic. How wrong we were! That was before we knew Toughy and his unconquerable spirit. Anyway, that's when we built the bird feeding platform for him.

He was a handsome figure, once aware of him; darker gray than others of his kind that we remembered seeing around in early and late spring. His body was bigger and brawnier and his legs longer. The white band on each of his wings was broader and whiter. And when he took off for a reconnaissance whirl, the white of his tail was a wide flash of snowy beauty; wider and whiter than most. We soon realized he had personality plus for he sold us the idea that really he would have gone South with the rest of his folks only he'd taken such a terrible shine to *us* he couldn't bear to leave. He had plenty of appeal and *oomph* and all the rest. One session with Mr. Malone and you were his for life.

At once he took to the feeding platform (something most birds shy from for awhile), thus demonstrating a bolder, freer attitude toward life than we had thought, and for days he stuffed in lonely splendor . . . raisins and cake crumbs, suet and apples. We gave him de luxe service. Placed the platform on a post among evergreen shrubbery for safety from cats; near a spruce he could use for night coverage and around the corner from some holly trees whose berries might serve as a change in diet when his appetite grew fickle. Mr. Malone led the life of Mr. Reilly. Then, gossip got around and, of course, food smells too. Other birds began to flirt with the idea of taking a chance on such tempting goods and soon there were more and more customers. Toughy let them alone at first; he was bighearted and no bird-in-the-manger . . . besides, he wasn't paying the check. They ate in turns, wary-eyed and ready to fly at a moment's notice. But, they ate. And they ate. And then, life went sour to Toughy. His table wasn't being kept in the manner to which he had become accustomed . . . particularly in the matter of apples.

Came the dawn of the hour when Toughy could stand no more. It was just midafternoon but only the shell of an apple was left! There was cracked corn and scratch feed that the other birds could use but he couldn't. His bill couldn't take it. Besides, he'd been used to a snack of fruit just before going to bed and now . . . there was no snack! But he kept his temper and used his head. We saw him sitting in a juniper at the corner of the garden . . . watching and thinking and although looking so calm, undoubtedly coming closer to the boil every minute. Suddenly, he flew straight at the platform . . . a ball-of-fire on the wing, but he didn't even alight. He barely brushed the branches of shrubbery. That was enough, however. Birds scattered in every direction and stayed scattered until hunger or greed lured them back. He let them alone for a bit then came at them again from another di-

rection, from around the corner of the house where he had been hiding. And he kept this up periodically until their bedtime.

From then on he played this game . . . some days many times; hiding now one place, now another; waiting until a congregation was gathered and placidly eating. Then, like an army with banners, a gray and white streak hurtled through the air and birds flew in every direction as if a bomb were bursting. He didn't do this through spite but through mischief; we could tell by the impish lilt in his tail as he fetched up from a raiding expedition. He had had his revenge for the apple that first day. He'd wiped that out. Also, we had kept him better supplied with apples thereafter. But the spirit of the chase got into him and he liked to show off.

He didn't care how big the bird was, either, or its possibilities for fight . . . wicked-billed woodpecker or large woodland dove or stocky cardinal. They were all the same to him. Not even a blue jay dared push him around. He would tangle with anything and truly was formidable looking as he swooped forward; hunched down, wings spread; drawing a baleful bead on the thing he was after. Just one bird stood his ground before Toughy Malone. He was a song sparrow . . . had a sparrow for a mother but we're positive his daddy was an eagle. He took Toughy's rarin' around as a joke and a bluff; flipped his tail and maybe side-stepped an inch, but was always still there on the platform when the smoke lifted. And Toughy could have gobbled him up and thought he was swallowing a bug, he was that tiny. We called him Kid Snitzle. Toughy tolerated him but there came a time when something occurred that must have made all the birds, including Toughy, admire the Kid extravagantly.

One winter's day over a foot of unprecedentedly heavy snow covered the feeding platform and until it could be cleared away, the birds hung around and did nothing, Toughy as unconstructive as the others. Due to the weight of the heavier birds, vainly wishing to get at the grain but doing nothing about it, and also due to the process of melting, the snow soon

Other mockingbirds were smaller than Toughy Malone

Allan D. Cruickshank

sagged in one spot making a toboggan slide straight to the coveted food. Not a bird took advantage, however, not even Toughy. Go down there into that cavern? Stick their heads in a new-fangled trap and get caught? Not they! They were too smart!

But, they weren't smart enough. And the intrepid Kid was. With but little time wasted in surveying the situation, he took the plunge; practically rolled up his trousers and after a long breath, seated himself on his haunches and slid down the toboggan. And it paid. Triumphant and cozy, down under, he gorged himself at his leisure and without competition. How he got out is the Kid's own secret but after awhile we saw his head emerge, then his body, and we guessed he did it the hard way . . . tooth and toe nail. We may have imagined the leer of satiety on his face. At any rate, he won the respect of all present and from then on the Kid strutted the platform unmolested.

Mr. Malone's mild, relaxed moments, when he cut out his clownish capers, came in the spring . . . courting and mating time. High on the top of a black gum was a branch, forked and leafless, and every afternoon Toughy could be seen swaying on this fork, comfy as if in a rocker and old slippers, singing his heart out.

That first winter he was a solemn looking object and the only mocker which hung around.

S. A. Grimes

Endless trills, arias, cadenzas or what have you, poured from his throat. In between improvisations he mimicked every bird we knew and plenty we didn't. It was a concert aimed to melt the heart of any feathered maiden. Whether he married for keeps and carolled thus to a steady wife of his bosom or whether each year he went courting anew, we didn't know. Mrs. Malone (or the Mrs. Malones) kept demurely in the background as befitted the helpmate of a type like Toughy and had no particular characteristics by which we could tell. I will admit, however, that in view of what happened four years later, there are doubts in our minds as to the emotional constancy of Toughy. However, he may have been a widower by then. Who can say?

When Toughy became a father he was even more of a changed man. Parenthood seemed to bring out the Mr. Hyde of him and he more than lived up to the name we had given him. Tough and hard boiled, he was full of fire and brimstone for all comers on the garden side of the house. That was his bailiwick. He threatened persons; he pecked the dogs, he pecked the cats . . . one of them, at least. He swarmed over that one and chased her clear to the house, pecking steadily at the base of her tail. He did the same thing to the dogs. The other cat had more of Toughy's calibre; either he hid under chairs or a hedge or turned over on his back with four paws extended, daring his tormentor to come nearer. And Toughy did go nearer . . . nearer and nearer. Snarling every inch of the way, with dancing little side steps, then a hop into the air, he came so close to his four-legged baiter we held our breath. He knew how near was safe, however.

We never saw the Malone nest nor their children until they were up and doing. But we often saw evidence of the care with which they were surrounded; the wide, wing-spread hoverings of the parents when a cat or any danger appeared . . . like the umbrella of planes we throw over our advancing armies nowadays. We witnessed also a comical display of the divergent views on discipline for the young that Mr. and Mrs. Malone held. Mrs. M. apparently went in for new ideas; Father M. was definitely old fashioned. It was one afternoon on the occasion of a trip to the feeding platform by the parents and one youngster. The lad knew how to eat . . . the great sputtering lummox was well developed and no nestling, but the brat in him was uppermost that day. He stood on a board that partially protected the platform; looked down on his parents; stamped his feet with spleen and yelled for service. The give and take of conversation between his elders was probably this:

"Let him express himself," says Mrs. Malone, placidly nibbling cookies and raisins. "He'll come out of it if you leave him alone."

"Express himself? He-eck!" raged her jittery spouse. "He's got to learn to shift for himself! I'll teach him!" And with a rush at the insubordinate young mocker he suddenly remembered his wife was watching; deflected his course and pretended to be going for suet.

But Papa Malone couldn't hold on to this Spartan self-discipline. He tried to ignore the racket, then his nerves frayed and with a mouthful of food he dashed over and crammed it down the youngster's throat. Young Malone didn't impress his mother, however. Her system won out. He finally recognized the truism that a man helps himself more if he helps himself; came down off his perch and the battle ended. I can imagine Mrs.

M. making a noise like a wife on the way home and saying:

"You see? I told you so."

And so, each year, for four years, we entertained and were entertained by Toughy. Then, as all good things eventually come to end, one March his saga was completed. I reveal it with reluctance for it's not a worthy ending. He didn't pass out heroically . . . gobbled up by a cat while defending his young, nor did he freeze or starve to death. Women were his undoing!

Winter before last he packed off his family to a warmer climate and loafed here alone as usual. Then came a Sunday afternoon early in March. The weather was mild and warm with hints of spring that tickled a young man's fancy. Toughy was not young now, by bird standards, but apparently he wanted to be. I had thought all winter that he looked more solitary than usual; melancholy and, at times, even droopy. His attacks at the crowds on the platform lacked the verve and dash of earlier days. This Sunday I had watched him pecking at his apple outside the big library window and was disturbed by his listless manner.

Suddenly, as if from nowhere, with indescribable twitters of excitement and jaunty bustling, a flock of birds appeared. They were young mockers, slim and so freshly feathered that their pale gray and white colors seemed vivid. They hovered over the feeding station . . . now on it, now flirting and fluttering in the air. And they chirped and cheeped for all the world like a bunch of giggling schoolgirls. I counted seven, when I could count them, but they were so full of animation it was difficult to follow their movements. Seven is good enough, however; the appearance of a septet of young southern belles would make a difference in any man's life. I lost sight of Toughy as this galaxy of beauty, bubbling gaiety and charm took over. I was too occupied with watching the streamlined girl orchestra.

They flew to the skeleton awning frame that hangs over the terrace; chased one another playfully, or maybe it was Toughy they were after; romped and then all together flew to an oak tree. For a few minutes that old oak blossomed with gayness and the giddy essence of youth. Then came a burst of melody, an aria of incredible sweetness; from one throat only, maybe Toughy's . . . maybe his farewell to us who had cared for him, his swan song . . . and then they were gone. And we never saw Toughy again. Some overpowering impulse must have possessed him, born of winter loneliness and depression, and he thought what the heck . . . you're only young once and went off with the bevy of beauties.

There is another mocker who spends the winters here now; a smaller, less lively bird. We don't know whether he is Toughy's ghost (if Toughy be dead) or a scion of the Malone family who, while sitting at his papa's knee, absorbed and vowed to carry on the spirit and traditions of the Malone dynasty. So far, the Malone mischief hasn't shown up in him. But he's young yet. We'll give him time.

Last summer, in the nighttime, with the moon a round silvery lantern and the air fragrant with honeysuckle, a mocker throbbed his song of ecstacy in the old gum tree. It sounded like Toughy at one of his matinee performances; Toughy in good voice and full of love in the springtime. And maybe it was. Maybe it was Toughy sounding off through one of his young ones. We like to think so, anyway.

A Pattern for Listening

By Charles A. Harwell

S. A. Grimes

Male Bullock's oriole at nest. These sweet songsters build their homes near those of man and are to the West what the Baltimore oriole is to the East.

HOW many birds do you know by sight, and how many by sound? It does not take long to demonstrate that sight records win. Among birders generally the *eyes* have it—*seeing* is believing. I have been out with some good observers who would never list an obvious and well-known songster because it didn't come into sight.

Call the grand crescendo of spring a chorus if you will, but I like to think of the music of the out-of-doors as coming from an original symphony orchestra with birds as the chief musicians. And what a sweep of instruments is playing from canopied woods, mountain amphitheaters, stream-side retreats and the great open spaces! Sparrows and warblers are my violins; doves the cellos; thrushes the flutes and wood-winds; orioles the brass section; large owls play bass for me while woodpeckers tap out the time. So far as I am concerned *Sturnella neglecta* can be the conductor. He stays year-round and insists on winter performances though he can muster but few willing musicians. Most of his instru-

mentalists are temperamental, insisting on a short concert season with long vacations for travel to more sunny southern lands.

You don't have to know the instruments of an orchestra to enjoy a symphony. Nor do you have to know what soloist or section is being featured in some passage of the theme. Perhaps it is enough to be able to derive pleasure from the total performance. But most of us are more inquisitive. We want to know all the instruments and their possibilities so that we can quickly pick them out from the ensemble, and more than that we like to be able to recognize the music. Give the master minds of *Information Please* a measure or two and they will tell you the name of the symphony or opera along with composer and dates. And if they were not stopped, they might even hum or sing the balance of it! Even those who approach juke boxes know which band leader and number they want to hear before they drop a nickel. Most of us are musically discerning – then why shouldn't bird music be a simple matter for us? Let me Deems Taylor a bit while the orchestra is tuning. I believe I can help you by offering some listening hints.

Each species of bird sings a distinctive song, differing from songs of all other birds in some of the elements of *pitch, range, length, rhythm* or *quality*. The arrangement of these elements produces pattern. So we can say that each species of bird has its own distinctive *pattern* of song. Some are delightfully simple and easy to learn, others delightfully complex, challenging our resourcefulness ever to know them.

Individuals of course may vary the "standard" pattern by some change in one or even all of the five elements I have listed. One bird may even vary from himself—you know how a mockingbird does just that. A song sparrow may have twenty or more variations to his theme, and among all song sparrows there must be thousands of possible variations. And yet it isn't difficult to recognize mockingbirds or song sparrows by voice, even though the pattern of song is so much varied. I have often watched singing western meadowlarks and have made a game out of counting the number of times a bird would sing one song before abruptly changing to another. Last July at Fresno a male sang six different songs in forty early morning minutes. The number of repetitions of each of his six songs was as follows: 15 - 13 - 29 - 13 - 5 - 20. Another at the Salton Sea made quicker changes, doing five different patterns in ten minutes, no one of which was repeated more than twelve times. Something inherently basic about each song made it easily recognizable as meadowlark.

I like to think of these performances as the playing of phonograph records. One record is played a certain number of times and then is turned over. Certain favorite records are run more times than others and extra favorite records are called back from time to time. Once in a while a needle seems to scratch terribly. Notwithstanding the shellac shortage, meadowlarks seem to go right on manufacturing new records all over their broad territory. May rationing never touch them!

Each species of bird has a distinctive annual singing pattern as well as a distinctive song pattern. *Time* and *place* are the key elements here. I can illustrate by a good story. During the summer of 1939, when Dr. Arthur A. Allen of Cornell was teaching at the University of California at Berkeley, I was park naturalist at Yosemite. In late June, Dr. Allen phoned me saying

he planned to bring the sound truck of the Albert R. Brand Bird Song Foundation to the park for the Fourth of July weekend, and asking whether I could guarantee he would get the songs of three birds: the Sierra grouse, the western tanager and the Townsend's solitaire. I told him he could get the grouse and the tanager but I would guarantee he would *not* get the solitaire! When he asked why, I declared that the solitaire never sings on the Fourth of July.

Dr. Allen arrived at night with his equipment and assistants and proceeded directly to the suggested location on the Glacier Point road. A day or two later he moved down to the floor of the valley and we had an enjoyable campfire evening with the Yosemite School of Field Natural History. He had recorded the songs of the grouse and of the tanager but not the solitaire. He found a nest where parents were feeding young and set up the sound equipment but never a song was heard. The *place* was right, but the *time* was wrong. Dr. Allen was a week or more too late and at least two months too early for full songs according to my Yosemite experience. In September this thrush starts coming back into song. October would be perfect. Juniper berries are then ripe on sunny slopes of high mountains and solitaires sing out their beautiful thanks for good food—but by that time Dr. Allen would have returned to Ithaca, New York.

A number of birds follow this same singing pattern: territory and mating songs on the nesting grounds in spring, then too busy or too tired to sing while bothered about babies, or moulting; then a resumption of song to protect feeding claims or to express satisfaction over accomplishments in fall and perhaps on into winter.

The brown towhee of the West demonstrates strange annual timing. He sings from early spring until mated, then just quits.

The male black-headed grosbeak goes out of song when he has family duties to perform; goes songless to Mexico and probably remains so throughout the winter.

Ruth and H. D. Wheeler

The owl tribe, especially the horned owl found throughout North America, adds the bass to Nature's symphony.

Bert Popowski

Some migrants sing en route. I heard black-headed grosbeak song in the Colorado Desert April 11, 1942. An advance company of eight males pilgrimaging north from Mexico, perhaps bound for Yosemite, had stopped to refresh or orient themselves near the cool stream in Andreas Canyon. The place and the time were right for just one of them to sing. Several days later a flock of forty male Bullock's orioles paused in this same region but neither time nor place seemed right for song according to the established annual cycle of this species. Some migratory birds sing all season on the wintering grounds. Good western examples are the golden-crowned sparrow and the Gambel's sparrow.

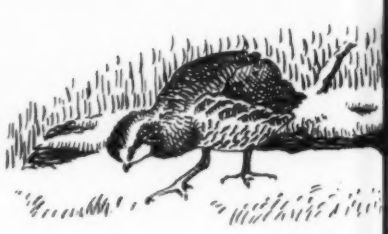
There are many other well-known examples of birds which remain in song practically the year round like mockingbirds, meadowlarks, quail, song sparrows, blackbirds and most owls.

Still another type of singing pattern stems from physiological conditions. It is the life-song cycle, and *time* is its essence. Baby birds in the nest chirp when hungry or impatient. Even these chirps follow a rather definite species pattern. When a few weeks old they come into better voice and food calls evolve, some of them quite musical. Here I think of black-headed grosbeaks and water ouzels. The life of a grosbeak is not long, my knowledge is not exhaustive, so I can quickly sketch the cycle of this bird.

At the age of three weeks, when they are as large as they will ever be, the baby-talk of black-headed grosbeaks grows into a sweet food call; a clear whistled *whee-you* of slurred pattern. In late July this is the only music of the family as the father has gone out of song. In August even this stops. The parents wouldn't know their own children, much less feed them, so food calls are outgrown. Soon all go songless to Mexico and so far as I know remain songless throughout the winter. (I have heard a caged black-headed grosbeak sing beautifully in September, but solitary confinement had thrown him all out of gear; he was in spring plumage and spring song.) By April, the young males join other males for the journey back to the nesting grounds where they seem to arrive in full song. Each one seems to head for his last year's territory, or in the case of the young, for the birth place. Principally by song and, at times, by combat they push each other around for a week or two until they are more or less equitably sprinkled over their nesting niche. Now it is time for the females to arrive. Guided by some inner urge and attracted by songs and, perhaps, by familiar surroundings, they too are soon sprinkled down upon the landscape according to an age-old formula of two-and-two. Song seems to increase in fullness and volume as home takes shape. The male of this species is an industrious singer and worker. He helps gather and place the twigs and rootlets for the one loosely-built nest of the year. Not only that, he helps incubate the eggs and sings as he sits. I know of only one other western bird which does that—the western warbling vireo. Grosbeak sings from high perch, low perch, or even on the wing, and for one-third the year; from mid-April until mid-July or from arrival on nesting grounds until young of the year become self-sufficient.

Much more remains to be said on the subject of listening to bird song, but why not start learning from personal experience now as the songsters begin to return? I can promise you that many hours of pleasure are ahead if you will establish your own pattern for listening.

Winter Feeding



WHEN the mercury drops to zero and icy winds blow across a snow-covered landscape, most of us are prompted by kindness to feed game which might otherwise die of starvation and exposure. However, it is also good conservation since feeding during such critical periods helps to insure the success of the next spring's breeding season by carrying over a number of adult breeders.

"Critical periods" are those when the severeness of the weather increases the amount of food required by any species out of proportion to the available supply, at a time when the game may be in poorest physical condition.

A bird may be in good flesh until an unusually severe storm smothers his range; the hardship involved in finding suitable food increases his physiological activities and needs, with the result that more food is required at a time when it is hardest to get. A distinct loss of weight may follow, and a general lowering of resistance makes it necessary for the birds to remain close to good cover in an effort to escape predation or exposure.

FEED WITHIN CRUISING RADIUS

Your tendency, when you go afield to feed wildlife, may be to scatter the food in some sheltered spot along a fence not too far from the road and the parked automobile. There may be two reasons for this. You may have several stops to make and a limited period in which to make your rounds, or you may have to carry a heavy grain sack through three feet of snow and against an icy wind. But if the food is scattered relative to the position of the car and its inviting warmth and not relative to the cruising radius of the birds, they may never find the grain, no matter how hungry they may be.

The cruising radius—the distance around an imaginary point which a bird will travel in any given period of time—may vary with the season, the species, the age groups and the sexes, but it remains fixed for any one species, of any one sex, of any one age, at any season. The birds may be teased over this normal radius in some cases, but this is a dangerous practice, since it may lead them too far away from immediate necessary cover. Locate the regional habitat (the one which supports the greatest number of game birds), then place the food within safe reach.

Good winter cover is a distinct necessity near the feeding station. Its value lies mainly in affording shelter for the birds from predation and from the elements as well. It may supply food if it happens to be a berry-producing thicket in which case its value is enhanced. Cover may be nothing more than a single shrub, or a boulder, or a tangled mass of vines, but its value is not measured by its appearance or constituent parts. Birds select it for the protection it affords and without it they must perish or seek new environmental location. If the cover is artificially constructed, it should afford protection from the air as well as from the ground. Built so that no fox could traverse its intricate tangle, it might be simple for a Cooper's hawk to drop in via the air route.

# of Game Birds

By Stanton G. Ernst

There are other factors to consider also. A wire fence nearby may be an unending source of sorrow. A startled bobwhite or pheasant has but one thought in mind—escape! Many times they will jump into the air and fly straight into a fence, crippling a leg or wing, or suffering decapitation. Then too, if they happen to touch a cold fence with some fleshy part of the body, they suffer the same fate as a human who grasps some steel object on a sub-zero day. Many blind birds taken by hunters have lost their eyes while picking up grain under a line fence on a cold February day.

If predators, attracted by the plentiful supply of feeding birds around the station, appear in too great a number, it may become necessary to change the location of the station. Also, the food itself must be watched, to see that rats, squirrels, jays and crows are not devouring it in great quantities. Most conservationists, however, are willing to let all species feed at the station, although when grain is scarce it must be used to the best advantage.

WHEN TO FEED

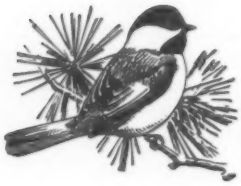
Timing is the most important single factor to be considered when you have launched upon a winter feeding program. When shall food be distributed? Many well-intentioned people distribute food when the supply is sufficient and the birds are in good flesh (in early winter), then cease when their enthusiasm has waned or their restricted allotments expended. This leaves the game in the unfortunate position of having their food supply cut off at the time it could best be utilized and when it is most needed.

EARLY SPRING A CRITICAL PERIOD

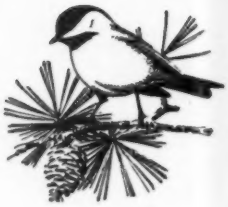
When are the critical periods? Generally, they come in late winter and early spring, the result of a combination of environmental influences. Following a rigorous winter, the largest number of birds have lost weight measureable in grams, and lack normal resistance. Food will be scarcest at this period; day and night the ground above and below snow cover has been searched over for vegetative food.

During the first early weeks of spring, sunshine exposes barren patches of sterile, brown ground, devoid of any suitable vegetative wildlife food. This ground is again searched, however, not only by the resident winter animals, but by the returning migrant birds and those animals coming out of hibernation.

At the same time, the physiological changes which are going on in the bodies of these animals require a change in food as well. The formation of ovaries in the female, and the enlargement of the gonads in the male often require more and different food. With the advent of the breeding season, animal diets are radically revised in many instances. Any feeding directed toward alleviating the shortage during this crucial period would be along the right lines, and might feasibly be the determining factor in "making or breaking" the breeding season. The values in feeding wildlife are determined not so much by how *much* food you distribute, but by *how* and *when* it is distributed.



The Director Reports to You



THE new year will see world-shaking and world-shaping events before it draws to a close. As the prospect of victory becomes brighter, so do the responsibilities of victory become more urgent in the minds of men. For total war has sown the seeds of a new awakening to a world-wide point of view, to recognition of mutual dependence and of the obligations that go with it. As conservationists, the future presents us with a task which demands the best that is in us and points to a need for cooperation at home if we are to exercise our proportionate influence in the larger global picture.

CONSERVATION CONFERENCE

Significant of the fact that conservation groups in this country are not unaware of this need is the meeting that is being held in Washington on January 18, 19 and 20, participated in by representatives of national conservation organizations. This meeting was postponed from December (as announced in our previous issue), and is taking place just as this magazine is going to press.

It furnishes opportunity for the heads of federal agencies to acquaint leaders of the private groups with the nature of anti-conservation pressures to which they are currently subject; pressures exerted behind smoke screens of claimed war need, but too often arising from nothing more than commercial attempts to gain entrenched privileges at the taxpayers' expense or to increase or cement state or local control of conservation policies in federal land administration. Also, it gives them a chance to tell something of their future program plans, whether in war or peace. It will then be up to the private groups to inform their members or a wider public, as may seem best.

THE AUDUBON BRANCH PLAN

The need for unity and cooperation comes right home to roost on our own doorstep. Although the rather loose organization which has characterized our Audubon cause in the past has been successful up to a certain point, it has long been the opinion of members of the Society and of local clubs throughout the country that we could accomplish much more in nation-wide education and in solving local problems if a closer bond existed between us. Much thought has been given to how this could best be achieved, how the National Society could make itself more useful to groups affiliated with it in carrying the banner of conservation in every state and town where they are located.

A plan whereby each club, if it so desires, can become an active branch of the Society, with each member holding joint membership in the local and national organizations has been finally evolved.

The alternative of remaining on the present affiliated basis would continue, intended in the main to serve organizations not primarily concerned with conservation of natural resources but wishing to continue their support and encouragement.

The St. Louis Bird Club, one of the strongest and most active of the affiliates, has become the first established branch, having taken the necessary

steps to adjust its constitution and by-laws. Other clubs have indicated their desire to organize as branches, with prospects of early realization.

The spontaneous enthusiasm for this method of closer cooperation between all Audubon followers is good evidence of the fact that all of us realize that every effort must count to the fullest if we are to succeed in making conservation a vital part of our national consciousness. If you would like to know more about the details, we shall be very glad to send them to you.

SCREEN TOURS DRAW LARGE AUDIENCES

Further proof of our conviction that the Society can perform greater service to local groups and to the public in general is the audience enthusiasm which has greeted the Audubon Wildlife Screen Tours in the ten midwestern cities where we are carrying on the experiment of presenting an illustrated lecture series. The first two lectures at Kansas City drew 1,000 people each. Omaha's first lecture drew 1,000 people. Milwaukee's first lecture had an audience of 800.

Think what this means in terms of growing strength and influence of our sponsoring branches or affiliates; think what it signifies in the spread of appreciative public interest in nature and the need of conservation!

In addition to our two staff lecturers, Bert Harwell and Alex Sprunt, three other outstanding lecturers generously agreed to assist in the program by delivering one lecture in each of the ten cities; these are John H. Storer of Waltham, Massachusetts, widely known photographer and speaker whose slow motion pictures of wildlife in action are unexcelled; Dr. Olin Sewall Pettingill, Jr., of Carleton College, Minnesota, Professor of Zoology and one of the most skillful wildlife photographers and delightful lecturers in the country; and Edna Maslowski of Cincinnati, wife of Karl H. Maslowski, now in the U. S. Armed Forces, who is carrying on the brilliant lecture work of her husband.

The series is scheduled through next May, with local organizations shouldering some of the costs, although the major portion of expense at present is being carried by the National Society. Next year we plan to carry the program into the South, and perhaps to other sections of the country as well. If you are interested in having further information and in scheduling any of the screen tours, please communicate with us at headquarters.

SINGER TRACT AGITATION

In a further effort to get at least a portion of the Singer Tract in northeastern Louisiana set up as a wildlife refuge before all of the virgin timber has been cut, your Director visited Louisiana in November.

It was found that there remained uncut only some fifteen sections, that is, square miles, of virgin hardwood timber—gum, ash and oak. However, the uncut portion includes an area in which ivory-billed woodpeckers were observed in recent years.

It should be stressed that, whereas we are anxious to make every effort to save the ivory-bill from extinction and to preserve this finest remaining stand of southern hardwood timber, the setting up of a wildlife refuge on the Singer Tract is a thoroughly sound and desirable objective, whether there be ivory-bills or virgin timber or not.

A most satisfactory interview was had with the Governor and Conservation Commissioner of the State of Louisiana, as a result of which the State was prepared to spend $200,000 on the acquisition of the heart of the uncut virgin forest area in the Singer Tract.

GOVERNORS APPEAL

On November 23, a joint appeal, signed by the Governors of Louisiana, Tennessee, Arkansas and Mississippi,

was sent to the Chicago Mill and Lumber Company and the Singer Manufacturing Company requesting their cooperation in the setting up of a wildlife refuge.

Renewed interest of the federal government in this project was roused. Secretary of the Interior Ickes wrote a letter to the companies, expressing his great interest and requesting their cooperation in the setting up of a wildlife refuge in the Singer Tract at this time, whether under federal, state or private auspices. The Fish and Wildlife Service stated that it was prepared to negotiate with regard to a lease with option to buy.

At the request of the Governor of Louisiana, a meeting was arranged in the office of the Chicago Mill and Lumber Company in Chicago on December 8th. Those in attendance were the top officials of the lumber company and representatives of the State of Louisiana, the federal Fish and Wildlife Service and the National Audubon Society. The officials of the lumber company stated flatly that they were unwilling to cooperate; that they intended to proceed with their logging program and would resent further effort on the part of the federal, state or private agencies to interfere; that they were not concerned with ethical considerations. It is rather an understatement to say that the representatives of the federal, state and private agencies present were disappointed at this "public-be-damned" attitude of the officials of the company.

WHAT PRICE DEMOCRACY

Now we come to the point at which we, as conservationists, must weigh the price of democracy against its advantages, for definitive final action by the state, which might save the area which it is prepared to purchase, is understandably delayed by the approach of elections. This is typical of situations that constitute a challenge to us to bring about, through educational efforts and resulting growth of favorable public opinion, a country-wide understanding such that the backing of sound conservation policies may seem not only right but the politically advantageous thing to do.

Rest assured that your Society will continue its best efforts to bring this project to a happy conclusion before it is altogether too late. Since early December, we have had a representative in the area, following up on the work of James Tanner, who as an Audubon Research Fellow, under the supervision of Dr. Allen of Cornell, spent several seasons making intensive studies of the ivory-bills in the Singer Tract.

We would like to take this opportunity to record our appreciation of the cooperation of the Governors of the four southern states and, also, of the officials of the Interior Department, and of the State of Louisiana.

PHOSPHATE FUMES AND ROOKERIES

Although the Chicago Mill and Lumber Company has refused to consider the public interest, we are glad to report that another industrial company has recently cooperated with us wholeheartedly. When the officers of the U. S. Phosphoric Products Corp., with plant on the eastern edge of Tampa Bay, Florida, were told that fumes were interfering with nesting birds, their concern was immediate and genuine. They cooperated to remedy the situation, even though such action undoubtedly entailed additional costs to the company.

This plant lies about two miles north of Green Key, where a colony of some 35,000 or more egrets, ibis and other birds are annually given careful protection by Audubon Warden Schultz. In the spring of 1943, the birds started a number of times to nest on this key, but kept abandoning their efforts. Warden Schultz and our

good friend, Dr. Herbert R. Mills of Tampa, who has been so intensely interested in the maintenance of Audubon warden service for this and other nesting keys nearby, were frankly at a loss to understand the cause.

Various possible reasons were considered: disturbance by the noise of airplanes overhead or by their dropping of bombs; possible depredations in unusual amounts by crows, owls or raccoons; the influence of the climate, the season being quite dry,—but all were discarded as being at the most only accessory factors. As usual man turned out to be the "villain."

Late in the summer, the pine trees began to turn yellow and showed evidence of dying as far south as Green Key and even farther. It was learned from the U. S. Weather Bureau at Tampa that there had been no more north or northeasterly winds than usual. After conference with officials of the company, it was agreed that fluoride, alone, and in unusual amounts, was responsible for the failure of the birds to nest at Green Key in numbers in 1943. Evidently Warden Schultz is more impervious than the birds or trees!

The officials of the company were as good as their word. By December 15 last, the fumes appeared to have been completely eliminated. Warden Schultz reports that the Ward's herons have already begun to nest at Green Key, and that the pelicans and other species have returned in greater numbers than usual for this time of year.

CROP DAMAGE BY DUCKS

There was never any doubt that an increasing duck population would create problems in the Sacramento Valley of California. The Valley is a choice wintering ground for ducks, and a desirable agricultural area for man, so conflict was bound to ensue.

This past fall, two unusual factors have intervened to bring the conflict to a head. In the first place, the De-

A. A. Allen

A century ago, in the days of Audubon, the ivory-billed woodpecker ranged widely through the Gulf states, north to southern Illinois and along the Atlantic seaboard to North Carolina. Will the last known habitat now be destroyed?

Fish and Wildlife Service

Your society is endeavoring to give new aid to the trumpeter swan.

partment of Agriculture asked the farmers to plant a great deal more rice than usual because of the war. Normally, a rice field is planted only once every two or three years. In their desire to help the war effort, farmers did not always have time to make proper preparation, with the result that ponds were made in the midst of some of the rice fields. This year, all the damage by ducks seen by our California representative occurred near the margins of such ponds. That there is direct correlation between good rice farming and an absence of duck damage becomes evident for where the crop has been correctly grown, there has been little or no damage: but where the farmer has atttempted to get a crop of rice from land that was improperly prepared, there has been considerable damage.

Another unusual factor this year was that the ducks, especially pintails, arrived some three weeks earlier than usual. In other words, the ducks, the weather or what-have-you did not cooperate any too well in an already trying situation.

To the solution of this problem the officials of the Fish and Wildlife Service have devoted earnest attention. The planting of grain crops on the existing wildlife refuges in the area, to be unharvested and left for the waterfowl, was greatly handicapped by lack of manpower. The acquisition of additional areas to be set aside for the feeding of the waterfowl was delayed.

Many experiments were conducted as to means of keeping the ducks in numbers from the rice-growing fields; the most successful has been use of paper grenades—exploding with much noise but doing no physical injury to the birds—accompanied by an airplane which proceeds to herd the flying flocks to outlying areas where there is feed, but where no commercial crop is being grown.

As a temporary expedient, the government has issued permits to a number of gun clubs in the Sacramento Valley, permitting them to put out grain to attract the ducks provided that it not be placed within 500 yards of a blind or shooting place; this in an effort to lure at least some of the birds from the crop fields. We shall hope to learn that the gun clubs carried out this program under permit in the best of faith and did not abuse the privilege. Feeding the ducks with bought grain has also been carried on at the big federal refuge at Willows.

It is the feeling of the Chief of the Fish and Wildlife Service that permanent preservation of the duck flight on the Pacific flyway is very largely tied up with success in providing winter feeding grounds for them in California.

AID FOR THE TRUMPETER SWAN

For some months there has been a project afoot, with your Society as a participant, designed to add to the protection now accorded the trumpeter swan by the federal government at the Red Rock Lakes Refuge in Montana and in Yellowstone National Park. At this writing, it cannot be said whether or not the project will materialize.

It seems in order, however, to summarize for your information the present status of this rare swan, as officially reported by the Fish and Wildlife Service. The Red Rock Lakes area is the more important for nesting and the warm springs and ponds of Yellowstone furnish the more important wintering grounds.

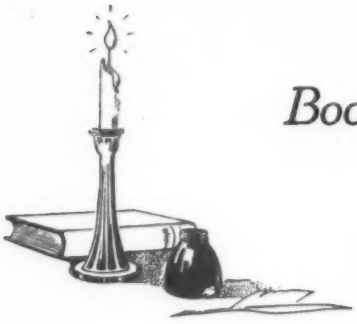
When the Red Rock Lakes Refuge was first set up, there were fewer than 70 swans. Since that time the swan population has trebled, and at last count, in August, the refuge manager estimated that there were on the Refuge, in Yellowstone and in nearby areas, a total of 221 birds.

Each year there has been a healthy output of cygnets, but considerable mortality during and after the first winter. The adult population, in spite of steady increase, does not increase at the rate that it might, judged by the number of cygnets produced annually.

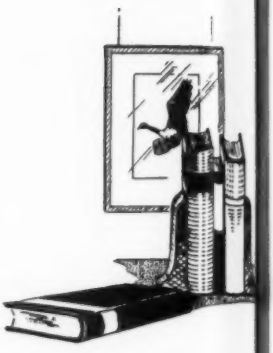
It will interest readers to know that there is a close association between swans and muskrats, and that the Service has found it desirable to carry on the refuge a high population of rats in order to have a sufficient number of rat houses for swan-nesting sites.

A shortage of open water in the area for wintering of the swans appears to be a limiting factor, and question has even been raised as to whether the winter adult population in this region may have reached the saturation point. Experiments have been made in the establishment of new colonies of swans at the Malheur and Elk Refuges; it is too soon to arrive at conclusion, but to date these transplantations seem to have been successful.

Next to the ivory-billed woodpecker, the Everglade kite, the white-tailed kite, the California condor and the whooping crane, the trumpeter swan appears to be the rarest North American bird. This statement may overlook some sub-species and a few species that are common in Mexico and occur only rarely on our side of the border. Certainly, our Society and other conservation agencies will want to take any reasonable steps that might serve to increase their number, whether by provision of additional range to suit their requirements, by better protection, or otherwise.



Book Reviews



THE BEHAVIOR OF THE SONG SPARROW AND OTHER PASSERINES.

By Margaret Morse Nice. 328 pp. Transactions of the Linnaean Society of New York, vol. VI. Price $2.75. Special price of $2.00 if ordered directly from the Linnaean Society, American Museum of Natural History, New York.

The literature of each field of human endeavor is adorned by a few outstanding contributions. They lift the subject at once to a new level, either by employing new methods, or by a novel approach, or merely by a superb summing up of the status of the field. They are simultaneously pioneer studies and masterworks and serve as starting points of a new era in their respective fields. Mrs. Nice's monograph of the song sparrow gives every indication that it will soon be regarded in the field of ornithology as one of these monumental contributions.

Volume 1, published in 1937, emphasized the ecology of the species, in particular all the aspects of the song sparrow population. Volume 2, published in September 1943, is devoted to a description and analysis of the song sparrow behavior. This short review cannot even begin to indicate the rich contents of the twenty-two chapters. Such topics are discussed as: The development and the activities of young birds; the daily cycle of activities; development, inheritance and function of song; the reproductive cycle in all of its phases (territory selection, pair formation, nesting, care of the young). Finally the question is discussed how much of the behavior is inborn and how much of it is learned. It can be said without exaggeration that no other bird exists in the entire world, the life history of which is even nearly as well known as that of the song sparrow.

By correlating the information on the behavior of this species with that of other passerine birds, Mrs. Nice presents us with a well classified digest of recent writings on bird behavior (29 pages of bibliography!). This treatise is far superior to anything of the kind that has been previously attempted. Many of the chapters, like those on the development of the young bird, on song, on pair formation, and on enemy recognition are complete treatises in themselves with enough meat in them to fill separate volumes. The professional animal psychologist will, no doubt, object to some of Mrs. Nice's interpretations, but, even if they should be found inadequate, this would in no way detract from the value of her original data or of her stimulating discussions. Mrs. Nice's presentation of her material is clearly adapted to the purpose of presenting as much detailed information as possible in the least amount of space. Her book is, therefore, not always "easy reading."

That this book is a "must" in the library of every serious bird student needs not to be emphasized. Personally I feel that even the casual bird lover will enjoy his bird walks infinitely better after he has had his eyes opened by Mrs. Nice. It may give him new ideas as to what to watch for in the birds of his garden or on his favorite bird walk. ERNST MAYR.

SEVEN SCORE BIRD SONGS.

By William Bacon Evans 258 pp. The Christopher Publishing House, Boston, 1943. $3.50.

These poems are by and large so thoroughly anthropomorphic that certain inaccuracies in the phonetic transcription of bird songs do not seem worth dickering over or going into such explanations as the author does.

There is no doubt that the writer knows birds and some of the poems are good expressions of their habits and personalities. However, most of the species are vehicles for moralizing, philosophizing, or other approaches not directly concerned with the subject matter.

The meters are gay and even "breezy." As a whole, the collection is pleasantly free of any over-gooey sentimentality, very fresh and modern. I can recommend it as refreshing reading for those of you who like light verse with meaning and do not expect flowery writing or a guide to bird song.

There are, in addition, social and religious sonnets, unconventional verse, battledore and a narrative poem.

DON ECKELBERRY.

COVERTS AND CASTS.

By William J. Schaldach. 138 pp. Illustrated. A. S. Barnes and Company, Inc., New York, 1943. $5.00.

Every time I read a book on hunting and fishing reminiscences such as this one, I am again surprised how much information an ornithologist can get from the sportsman.

The writer has an exceedingly good style—not over nostalgic or over masculine or over adventurous. The text is informative, humorous, descriptive, yet very simple and well organized.

Mr. Schaldach's illustrations are of variable quality. The pencil drawings for the most part are too "cluttered" with detail, the ink sketches heavy handed. The full color "spot" water colors, much the best, are handled simply and directly.

This is really a very handsome gift book for the real sportsman.

DON ECKELBERRY.

THE AMERICAN LAND.

By William R. Van Dersal. 215 pp. Oxford University Press, New York, 1943. $3.75.

The author more than achieved his objective—to show the drama and human interest in the American land, not just in the spectacular mountain landscapes of the west, but in the enormous areas of land used principally for farming.

The introduction is a delightful bit of American history, briefed from many sources, showing the nature of our continent when the white man first began to see it, the unequalled primeval forests, the fine verdure of the prairies, the spontaneity of the desert. This new land of unbelievable fertility and productiveness is believed to have been capable of supporting a population of perhaps 200 million people—truly a land of promise.

As America grew the land pattern changed. The frontier moved westward from the Atlantic to the Pacific, free land and the rights of the Indians disappeared together, and were rapidly followed by the elimination of the magnificent stands of virgin forest and prairie grass. Eventually all the land was owned by the people, their local, state, or federal governments. People from Europe changed the land: the land had changed the people.

The people brought with them the seeds of the crops they knew and they found some here not known to Europe.

The adaptation of the crops to the new land is primarily the story of plant breeding, of selection and hybridizing of the kinds which would grow best. Out of thousands and thousands of simple lay experiments by the tillers of the soil or the carefully planned experimental projects by the plant breeders, came our grains, fruits, and vegetables of today.

The 64 excellent plates of photographs grouped throughout the chapters make a dynamic story in themselves. The amount of land devoted to the various crops, the value of the annual production of each, and the new and many uses of the products, impress the reader with the vast scope of our assets in land and people. These chapters cannot help but interest the student, teacher or casual reader in the geography, economics, and natural history involved in raising wheat, peanuts, cotton, limes, pecans, mangelwurzels, flax, dates, tung nuts, okra, hops, tobacco, and the many other crops grown in the United States.

As the uses of our land increase, as we attempt to rebuild our depleted forests, resod our wind-blown grasslands, increase our wildlife populations through wise management, hold our soil and water by round-the-hill instead of square farming, and make our continent a richer and better place to work and play, we become prouder of our inheritance. We have created a new land pattern, and a new pattern of thinking in America which is beginning to spell CONSERVATION.

RICHARD LEE WEAVER.

SHRUBS OF MICHIGAN.

By Cecil Billington, 250 pp. Cranbrook Institute of Science, Bloomfield Hills, 1943. $2.50.

This Bulletin, No. 20, in the fine series of publications by the Cranbrook Institute of Science endowed to promote understanding and knowledge in the fields of natural sciences, is a very usable handbook. The author although posing as a layman writing for laymen, has produced a work which any professional botanist would be proud to claim.

As in similar manuals, the author introduces you to the shrubs by explaining the value and uses of simple keys, scientific names, and principal terms used in describing shrubs. The latter are illustrated with a 10 page pictorial glossary. The keys are adapted from "Keys to Woody Plants" by W. C. Muenscher of Cornell University.

Added to the usual description of each shrub, the date of flowering, the habitat and range, a distribution map is given for each one with the actual record as evidenced by herbarium specimens and published lists by counties. A line drawing (161 in all) of a branch, leaf, flower, seed or fruit is given for most of the specimens.

This scholarly handbook will undoubtedly find wide usage both within and without the State of Michigan. It is a fitting companion to "Orchids of Michigan," "Liverworts of Southern Michigan," and "Edible and Poisonous Mushrooms of Southeastern Michigan," all published by The Cranbrook Institute of Science.

RICHARD LEE WEAVER.

THE COVER BIRD

By Don Eckelberry

Seeing my first buffle-head was a boyhood picture years will not erase. Creeping around a cove of a little Ohio lake, I found myself not four yards from an unsuspecting drake sleeping in the late November sunshine, his bill tucked deep in his back.

Floating buoyantly like a fluffy cork with only an occasional languid stroke of his right foot in the muddy green water to keep him from going anywhere, he was dazzling—as black as black and as white as white can be. I was sure he could hear my pounding heart; both fists would not keep it quiet. I watched until I could bear it no longer. Jumping up, my beautiful bird went pattering out in the lake in wild alarm and I was all weak and sweating.

Usually we see buffle-heads in small compact groups flying low and swiftly over the water or bobbing about in a mixed raft of ducks.

Their smallness is attested by the fact that throughout western Canada they nest in the holes of flickers and the larger woodpeckers. The winter range is west of the Rockies, Texas, south of the Ohio river valley and Boston.

Letters

Sirs:

I have enjoyed your magazine for many years, but I think your November-December issue is about perfect. Each article is fine, but Alan Devoe's "Christmas Over the Land" is a meditation to be preserved.

I am glad to send $2 for a subscription of such beauty and cheer for a camp or hospital library.

ANNIE D. BRUMBAUGH

Orange, N. J.

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Sirs:

Not long ago you published a letter of mine about how much the boys who use the Andrew Furuseth Club enjoyed the back copies of AUDUBON MAGAZINE sent to them by your members. As a result of this letter, Virginia Eifert of the Illinois State Museum sent us a number of magazines, including THE LIVING MUSEUM, LEAVES AND STEMS FROM FOSSIL FORESTS and her beautifully illustrated book BIRDS IN YOUR BACKYARD. Such contributions as these will give our SEA MAGS a considerable lift, as this is the most effective form of morale building material with which we can fortify the men in the cheerless off-watch hours at sea.

LORENA LEWIS

New York City.

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Sirs:

You may be interested to know that the person in charge of the war-time nursery schools in Oakland (operating under the Lanham Act) read my article "Challenge to Women" in AUDUBON MAGAZINE, and decided to incorporate bird study in the schools. I am going to appear before their teachers and start the work going!

LAUREL REYNOLDS

Piedmont, Calif.

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Sirs:

In all my readings and wanderings I have not discovered anyone who thinks along quite the same lines as I do until I began to read Alan Devoe in your wonderful magazine. I really appreciate his "Christmas Over the Land" and my greatest ambition is to own my own "Hundred Acres" such as Mr. Devoe described a few issues ago.

PAUL FRYXELL

Moline, Ill.

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Sirs:

I became a subscriber to AUDUBON MAGAZINE in 1943 and, to my mind, it is one of the best publications we have in these United States to-

days. Its scope is wide and the material co tained within its pages is fascinating. I thin every issue better than the preceding one, such a thing can be possible.

ZELL C. LEE

Sioux City, Iowa.

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Sirs:

I do want you to know how very much m husband and I enjoy AUDUBON MAGAZINE.

After we have read and re-read it to ou hearts' content, we are now giving it to ou library here.

Each and every article has its own particula charm and interest, is instructive and educa tional. Never before in history was a magazin performing such a national service.

With food problems so numerous, do mo people realize how much more numerous the would be were it not for our little feathere friends who devour insects? It is distressing t think of the heavy toll which must have bee taken of birds in wartime countries. It's a jo to think of our sanctuaries, God bless them, an those responsible for them.

NANCY C. WELLS

Katonah, N. Y.

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Dear Audubonites:

Here I am somewhere in England. The mo I see of England the more I admire it. Th towns are very picturesque and as a rule excep tionally clean. I have seen some of the mos beautiful cathedrals in the world.

The countryside reminds me of our ow Westchester County manicured by centuries o care. The land is divided into rather small se tions, each section marked off by one of a grea variety of attractive fences or hedgerows. Th quaint farmhouses are all of brick or stone. have seen no large barns such as we have—in stead the hay is stacked in trim but giganti piles in the farmyard and generally surrounde by cows, goats, chickens and ducks.

Much of the vegetation is the same as our When I walk in the fields of bracken or thick ets of cat-tails and phragmites, I get homesick Naturally I have seen a great many new bird . . . black-headed gulls, dunlin, lapwings, mag pies, rooks, various tits, kestrels, native wren blackbirds, robins and what not!

In these times a student of natural histor has a decided advantage. No matter where h is, on land or sea, he has a hobby—a vital inter est—that never fails.

Happy New Year to everybody! Remember bird in the bush is worth two in the hand Whoopee!

ALLAN CRUICKSHANK

Somewhere in England.